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# NEVADA RANGELAND PHENOLOGY

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# NEVADA RANGELAND PHENOLOGY

Bureau of Land Management

1979

Prepared By:

**NRC, Inc.**

Reno, Nevada

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ELKO

WINNEMUCCA

CARSON CITY

CARSON CITY (NORTH OF RENO)

ELY

LAS VEGAS

BATTLE MOUNTAIN

TONOPAH

CARROLL SUMMIT

APPENDIX I

# ACKNOWLEDGEMENT

NRC would like to thank the field personnel in each BLM district. Everyone was very co-operative, and the project ran very smoothly the past four years. We would also like to thank Mike Phillips and Don Jarvis for their interest and cooperation.

# INTRODUCTION

This is the fourth and final yearly report presenting phenological data obtained statewide in Nevada. The data has been summarized for each district, and the information presented here will be useful for predicting plant phenological events.

Objectives:

1. To obtain phenology information for selected species from sites distributed statewide on BLM jurisdiction lands
2. To compare data for the growing seasons for the years 1976, 1977, 1978, and 1979 for selected species and sites
3. To present this data to the BLM in a useful format, along with some qualitative interpretations to serve the BLM as a guideline for their use and continued analysis and interpretation

# METHODOLOGY

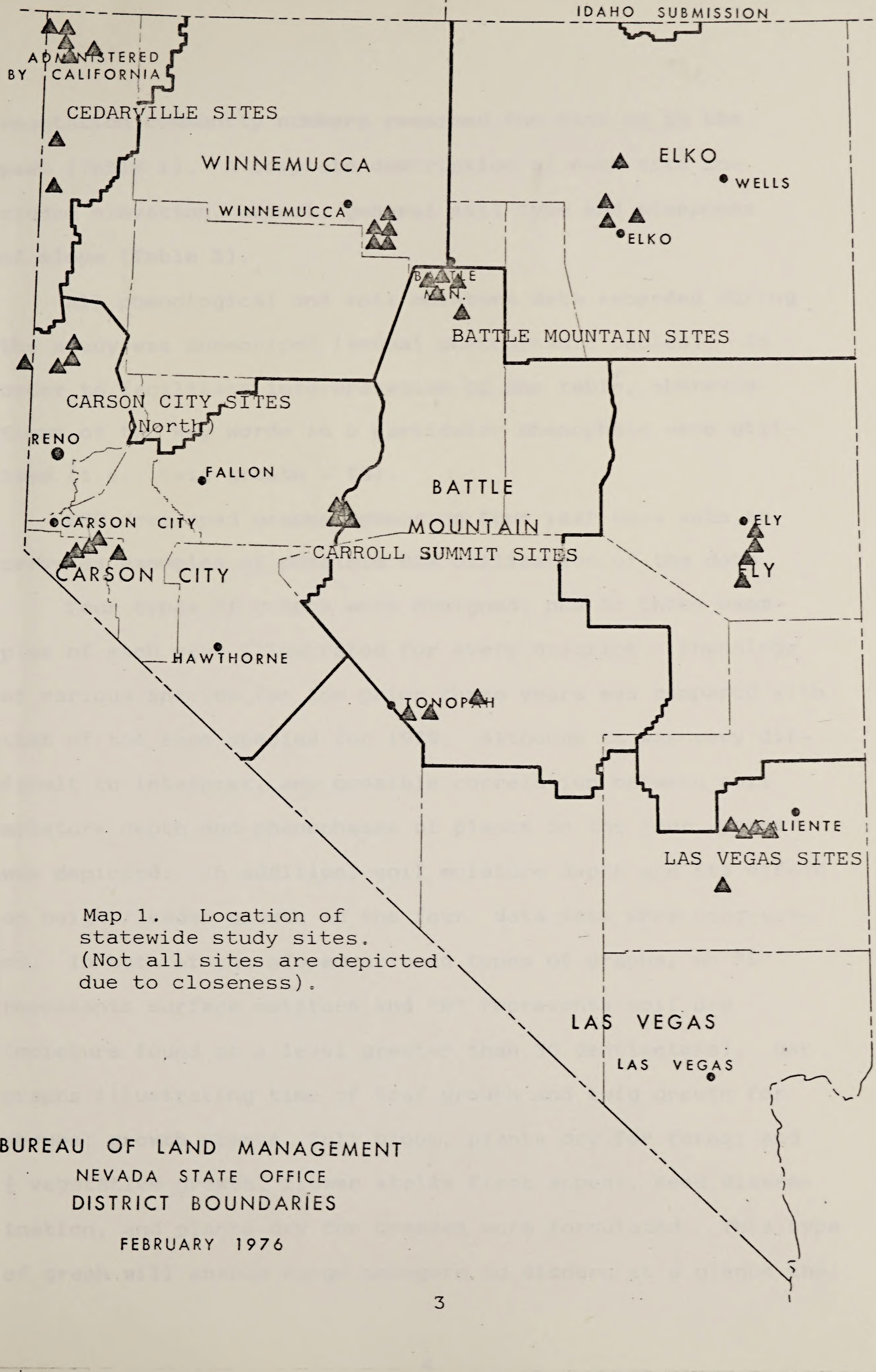
Each BLM district (Elko, Winnemucca, Carson City, Ely, Las Vegas, and Battle Mountain [including Tonopah]) and NRC, Inc. utilized the same sites as the last three years (Map 1). Carson City also has additional sites north of Reno.

Methodology for plant community and species selection, and methods for measuring vegetation remain the same as discussed in the 1976 and 1977 reports.

Average vegetation phenophase and height/leader growth were rated and noted on the same form all four years. In addition to soil moisture depth (band of moisture), field personnel collected data on soil temperature. Temperatures (every site/each visit) were collected at the same place each week, 10 to 15 centimeters below the surface. Rain cans to measure precipitation were installed at most sites; Elko utilized soil moisture bars instead of rain cans. All measurements were recorded in millimeters or centimeters, and Celsius degrees.

Data gathering began early, with some districts beginning as early as January (Las Vegas). Generally, sites were visited weekly March through May, approximately every 10 days in June and July, every other week in August and September, and at least once in October. Some districts gathered data in November, which was the cut-off date. A few districts had problems with a restricted number of personnel, and were therefore not able to go into the field as often as would be desired.

Each district kept the same representative numeral, and



Map 1. Location of statewide study sites. (Not all sites are depicted due to closeness).

vegetation community numbers remained the same as in the past (Table 1). A complete description of each site included elevation, aspect, general soil type and steepness of slope (Table 2).

All phenological and soil moisture data recorded during the study was summarized (annual phenodynamic tables). In order to facilitate interpretation of the table, abbreviations of two key words in a particular phenophase were utilized (i.e., twig growth = TG).

NRC developed graphs comparing four year data sets to serve as examples of possible BLM utilization of the data.

Four types of graphs were designed; one to three examples of each were illustrated for every district. Phenology of various species for the prior three years was compared with that of the same species for 1979. Although it was very difficult to interpret, any possible correlation between soil moisture depth and phenophases of plants in the four years was depicted. In addition, soil moisture depth and its effect on height/leader growth in the four data sets were contrasted. In both of the aforementioned types of graphs, an "S" represents surface moisture and "D" represents soil dry (moisture found at a level greater than 30 centimeters). Bar graphs illustrating time of leaf growth and twig growth for shrubs; growth starts, full bloom, plants dry for forbs; and ½ vegetative growth, flower stalks first appear, seed dissemination, and plants dry for grasses were formulated. This type of graph will enable range managers to discern at a glance the

Table 1. Key numbering system assigned to BLM district and NRC sites.

| DISTRICT | NUMBER |
|---|---|
| Elko | 01 |
| Winnemucca | 02 |
| Carson City | 03 |
| Carson City (North of Reno) | 03A |
| Ely | 04 |
| Las Vegas | 05 |
| Battle Mountain | 06 |
| Tonopah | 06A |
| Carroll Summit | 07 |

| VEGETATION TYPE | NUMBER |
|---|---|
| Southern desert shrub | -1 |
| Salt desert shrub | -2 |
| Northern desert shrub | -3 |
| Seeding | -4 |
| Pinyon/juniper | -5 |
| Mountain meadow | -7 |
| Coniferous forest | -8 |
| Salt marsh | -9 |
| Degraded with annual grasses | -10 |
| Riparian | -11 |

Table 2. Elevation, aspect, slope and soil type of BLM and NRC, Inc. sites in Nevada utilized for data gathering.

| SITE | ELEVATION | ASPECT | % OF SLOPE | SOIL TYPE |
|---|---|---|---|---|
| Las Vegas: | | | | |
| 05-1-1 (So.D.S.) | 2,780 | Level | 0 | - |
| 05-1-2 (So.D.S.) | 4,080 | South | 3 | Sandy loam |
| 05-2 (S.D.S.) | 4,800 | Level | 0 | Loam |
| 05-3 (N.D.S.) | 5,600 | Level | 0 | Loam |
| 05-7 (M.B.) | 6,000 | S.W. | 15 | Sandy clay loam |
| Carson City: | | | | |
| 03-2-1 (S.D.S.) | 5,040 | Level | 0 | Gravely sand |
| 03-3-1 (N.D.S.) | 5,080 | Level | 0 | Sandy |
| 03-3-2 (N.D.S.) | 5,326 | East | 2 | Sandy |
| 03-5-1 (P/J) | 5,720 | West | 1 | Rocky-sandy |
| 03-5-2 (P/J) | 6,880 | East | 5 | Sandy |
| 03-5-3 (P/J; dropped) | 6,840 | N.W. | 5 | Rocky |
| 03-5-4 (P/J) | 6,410 | West | 2 | Meadow |
| 03-7-1 (M.B.) | 7,800 | North | 10 | Sandy rocky loam |
| 03-7-2 (M.B.; dropped) | 7,260 | N.W. | 5 | Rocky-sandy |
| 03-7-3 (M.B.) | 6,280 | East | 1 | Sandy |
| 03A-3 (N.D.S) | 5,000 | N.E. | 10 | Sandy |
| 03A-4 (seeding) | 5,400 | South | 5 | Sandy |
| 03A-5 (P/J) | 5,200 | N.E. | 19 | Sandy |
| 03A-7-1 (M.B.) | 5,740 | Level | 0 | Sandy |
| 03A-7-2 (M.B.) | 6,400 | N.E. | 53 | Sandy loam |
| 03A-2 (S.D.S.) | 4,240 | S.E. | 1-4 | Sandy |
| Tonopah: | | | | |
| 06A-2-1 (S.D.S.) | 6,170 | North | 6 | Clay loam |
| 06A-2-2 (S.D.S.) | 5,520 | East | 3 | Sandy loam |
| 06A-3 (N.D.S.) | 6,400 | East-wash | 6 | Sandy loam |
| Elko: | | | | |
| 01-3 (N.D.S.) | 6,170 | N.E. | 4 | Clay loam |
| 01-4 (seeding) | 5,870 | N.E. | 4 | Clay loam |
| 01-6 (M.M.) | 5,676 | Level | 0 | Loamy sand |
| 01-7-1 and 2 (M.B.) | 6,266 | North | 40 | Silty clay loam |
| 01-10 (A. grass) | 5,676 | S.W. | 4 | Sandy loam |
| Battle Mountain: | | | | |
| 06-2-1 (S.D.S.) | 4,547 | Level | 0 | Sandy |
| 06-2-2 (S.D.S.) | 4,740 | S.E. | 5 | Clay |

Table 2 Continued-

| SITE | ELEVATION | ASPECT | % OF SLOPE | SOIL TYPE |
|---|---|---|---|---|
| 06-2-3 (S.D.S.) | 4,590 | East | 2 | Sandy loam |
| 06-3 (N.D.S.) | 6,100 | West | 85 | Rocky |
| 06-7 (M.B.) | 6,150 | East | - | - |
| Winnemucca: | | | | |
| 02-2 (S.D.S.) | 4,800 | East | 2 | Loamy |
| 02-3-1 (N.D.S.) | 6,200 | S.E. | 25 | Clay skeletal |
| 02-3-2 (N.D.S.) | 5,200 | East | 4 | Loamy |
| 02-6 (M.M. | 6,900 | S.E. | 8 | Clay skeletal |
| 02-7 (M.B.) | 7,200 | S.E. | 21 | Clay skeletal |
| 02-11 (Riper.) | 5,600 | East | 7 | Loamy |
| Ely: | | | | |
| 04-2 (S.D.S.) | 6,600 | West | 5 | Loam |
| 04-3 (N.D.S.) | 6,800 | East | 5 | Loam |
| 04-5 (P/J) | 7,520 | S.E. | 5 | Loam |
| 04-6 (M.M.) | 7,280 | South | 5 | Silty loam |
| 04-7 (M.B.) | 8,000 | Level | 0 | Stony loam |
| 04-8 (Con.F.) | 8,600 | N.W. | 30 | Stony loam |
| 04-9 (S.M.) | 6,520 | East | 5 | Silty loam |
| Carroll Summit: | | | | |
| 07-2 (S.D.S.) | 5,200 | N.W. | 4 | Stony loam |
| 07-3 (N.D.S.) | 6,080 | S.W. | 3 | Loam |
| 07-5 (P/J) | 6,650 | South | 38 | Sandy loam |
| 07-6 (M.M.) | 7,360 | N.W. | 14 | Clay loam |
| 07-7 (M.B.) | 7,520 | North | 40 | Rocky loam |

the time period in which important phenophases occur and how they vary from year to year.

Graphs and complete data sets are listed by district, and include a discussion with each. A district map showing specific location of each sample site is provided.

Common and scientific names of all plants used in the study are listed in Appendix I.

In order to facilitate interpretation of the data sets, please refer to "Reading and Understanding the Annual Phenodynamic Tables".

## ANALYSIS AND INTERPRETATION

This project has generated four years of plant phenological data on important range plant species throughout Nevada. A good cross-section of important range sites and environments have been sampled.

The data have been summarized, plotted, and subjectively interpreted. The strength of the correlations between phenophase development and influential parameters such as soil moisture, soil temperature, and precipitation should be statistically analyzed.

In order to accomplish these analyses, it would be useful to key punch the data onto cards for computer analysis. Several statistical routines should be used to test the relationships suggested during the course of the study. The purpose would be to determine the probability that these relationships will hold true during the time frame of proposed management plans designed for rangelands in the future.

## GENERAL RESULTS AND CONCLUSIONS

Full benefit from the data will be derived only after the information has been entered into the computer, where a series of comparisons can be easily made. After four years, however, it appears that some patterns are emerging relative to the growth and development of the key species measured or followed during these studies.

There are some relatively prominent relationships between the development of a given species and the contemporary moisture and temperature patterns. There appears to be some strong correlations between the initiation of twig and leaf growth and the receipt of some level of precipitation during the preceding 30 days. There is also quite likely an interaction with soil temperature. For example, the development of grasses is highly dependent upon April, May and June precipitation, but significant growth of both vegetative and reproductive culms does not occur until soil temperatures warm up above 12-13 °C. The data points this out clearly, and while this has generally been a known factor about grass development, the data presented here will better establish the timing and thresholds for development that have been difficult to determine in the past.

For many species, plotting of all four years showed that the phenophases were extremely close irrespective of moisture and temperature regimes. In other words, development was essentially the same for all four years. This included the initiation of growth, the length of the reproductive period

and onset of maturation. All phenophases occurred on nearly the same dates and for the same number of days. However, the opposite was true for numerous other species, wherein the phenodynamic showed considerable variation when the four years were compared. It would appear that four years is enough for certain species to define variation, while others need more than four years to define variability.

Many grasses and forbs complete their life cycle more rapidly when soil moisture is limiting. Some species show this potential, while others do not. The amount of variation found suggests that there may be no pat answers to phenodynamic analyses. These data strongly suggest that each site selected for a grazing management program will require an evaluation of the phenodynamics of key species.

# PHENODYNAMIC TABLE GUIDELINES

# READING AND UNDERSTANDING THE ANNUAL PHENODYNAMIC TABLES

To facilitate interpretation of the data, look at the "Symbol Sheet" with the phenophase abbreviations.

Each graph is divided into months which are subdivided into weekly time periods. An abbreviation appearing within the first time period signifies that it occurred approximately between day 1 and day 7 of that month.

Soil moisture depth is listed in centimeters for all sites. The first number represents where moisture started (distance from the top of the surface), and the second shows to what depth the moisture continues. If the latter number is listed with no period after it, the moisture is considered to continue (i.e., 15-30 =15-30+ centimeters). Field personnel were often unable to dig much deeper due to hardpan, rocks, etc. If soil moisture is listed with a period after it, the moisture is considered as stopping at that point (i.e., 5-8.). Soil temperature is listed in Celsius degrees, and precipitation, in inches.

The scientific symbol for each plant is listed with its phenophases depicted. Phenophases are listed once and considered to continue until another phenotype is depicted.

Toward the latter months, some species had regrowth and that is shown with underlining.

In September, October, and November, data was sometimes collected only once or twice per month; therefore, some

phenophases may have been missed. In these instances, phenophases in-between will have to be interpolated.

Various abbreviations have been used on the graphs. The following is an explanation:

gu = green up

sn = snow

fr = frozen

gr = grazed

## Legend for 1976 through 1979

| 1976 | 1977-1979 | Data Sheets | Phenophase |
|---|---|---|---|
| **SHRUBS** | **SHRUBS** | | |
| | D | 0-9 | Dormant |
| \\ | LG | 10-19 | Leaf Growth |
| //// | TG | 20-29 | Twig Growth |
| ○ | BV | 30-39 | Flower Buds First Visible |
| □ | FG | 40-49 | Leaves Full Grown |
| ◊ | 1B | 50-59 | First Bloom |
| ♦ | FB | 60-69 | Full Bloom |
| ● | BO | 70-79 | Bloom Over |
| △ | SR | 80-89 | Seed Ripe |
| ▲ | SD | 90-99 | Seed Dissemination |
| ◇ | LY | 100-109 | Leaves Turn Yellow |
| ◆ | LD | 110-120 | Leaves Dry & Drop |
| **GRASSES** | **GRASSES** | | |
| | D | 0-9 | Dormant |
| \\ | GS | 10-19 | Growth Starts |
| □ | $\frac{1}{2}$V | 20-29 | $\frac{1}{2}$ Vegetative Growth |
| ○ | FS | 30-39 | Flower Stalks Appear |
| ♦ | HO | 40-49 | Heads Out Fully |
| ✳ | An | 50-59 | Anthesis |
| ◬ | DS | 60-69 | Dough Seed Set |
| △ | HS | 70-79 | Hard Seeds |
| ▲ | SD | 80-89 | Seed Dissemination |
| ◇ | BD | 90-99 | Plants Begin to Dry |
| ◆ | PD | 100- | Plants Dry-Summer |

## Legend for 1976 through 1979

| 1976 | 1977-1979 | Data Sheets | Phenophase |
|---|---|---|---|
| FORBS | FORBS | | |
| | D | 0-9 | Dormant |
| ⑊ | GS | 10-19 | Growth Starts |
| ○ | FS | 20-29 | Flower Stalks Appear |
| ◊ | 1B | 30-39 | First Bloom |
| ⧫ | FB | 40-49 | Full Bloom |
| ◈ | BO | 50-59 | Bloom Over |
| △ | SR | 60-69 | Seeds Ripe |
| ▲ | DS | 70-79 | Dissemination Starts |
| ◇ | BD | 80-89 | Plants Begin to Dry |
| ◆ | PD | 90- | Plants Dry |
| ⬡ | GR | | Grazed |

---

Soil Moisture Depth:

- S= surface moisture
- D= soil dry
- BR= any soil condition which prevents further digging. (i.e, hardpan, rocks, etc.)
- fr= frozen
- gr= grazed
- gu= green-up
- sn= snow

# DISTRICT INFORMATION

BA LE
WINNEMUCCA
C RROLL
CARSON CITY
(NORTH)

## ELKO

The fourth season of data further establishes the general pattern of growth and development for range species near Elko (Figures 1 and 2). The phenology of bitterbrush (*Purshia Tridentata*) is notable for the rather close correspondence among the four years. For this species four years of data seems to define well the phenological development. Phenology of the perennial sandberg bluegrass (*Poa sandbergii*) shows somewhat more variability among the four years. However, another perennial grass, squirreltail grass (*Sitanion hystrix*), shows a tight pattern for the four years (figure 3). Height growth of this species shows little relationship to soil moisture depth, although a dry period in June of 1977 slowed development (Figure 4).

Leader growth of green rabbitbrush (*Chrysothamnus viscidiflorus*) is not clearly related to soil moisture depth (Figure 5), although it may be related to quantity of soil moisture.

Among the grasses at the Elko sites, the initiation of vegetative growth is rather consistent, while the appearance of flower stalks, seed dissemination and maturity varies over several weeks depending upon the year (Figure 6). For shrubs, initiation of leaf and twig growth are both quite variable from year to year (Figure 7). Twig growth of green rabbitbrush began somewhat earlier than either bitterbrush or wild buckwheat (*Eriogonum* sp.). Forbs showed growth patterns with greater consistency than the shrubs (Figure 8). Maturity of balsamroot

(*Balsamorhiza saggitata*) was several weeks later than bluebells (*Mertensia oblongifolia*).

A review of the leader growth data for all species (Table 1) suggests that the 1978 and 1979 growth years were somewhat better than either 1976 or 1977. Such data should be reviewed in comparison to climatic data for the years involved.

Elko utilized soil moisture bars instead of rain cans to measure their "precipitation". A reading of -.2 represents saturation of the soil, -5.5 represents dry, and -15 means wilting point for the plants.

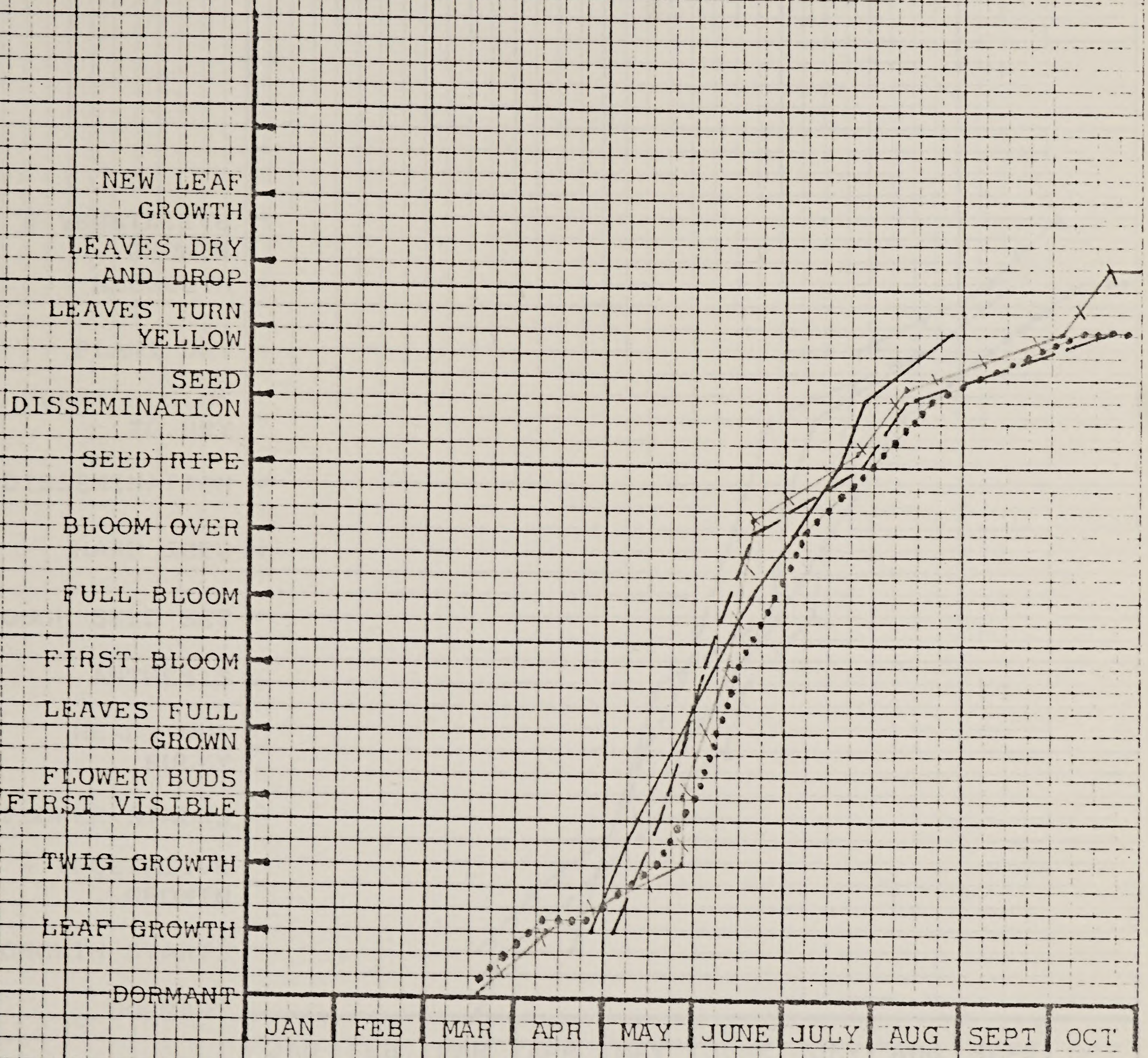


Fig. 1. Phenology of *Purshia tridentata* on mountain brush vegetation type (site 01-7), Elko District.

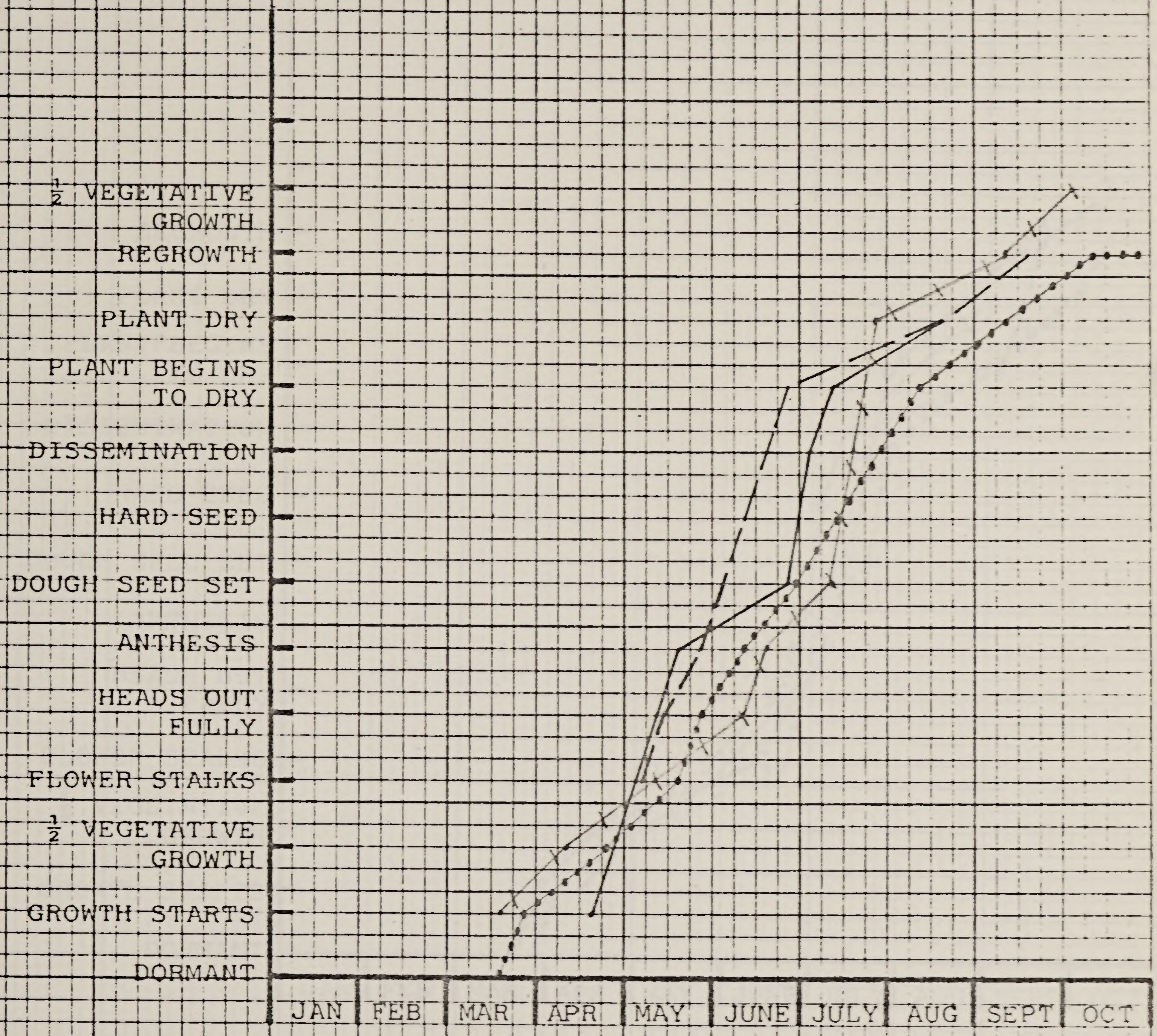


Fig. 2. Phenology of *Poa sandbergii* on northern desert shrub vegetation type (site 01-3), Elko District.

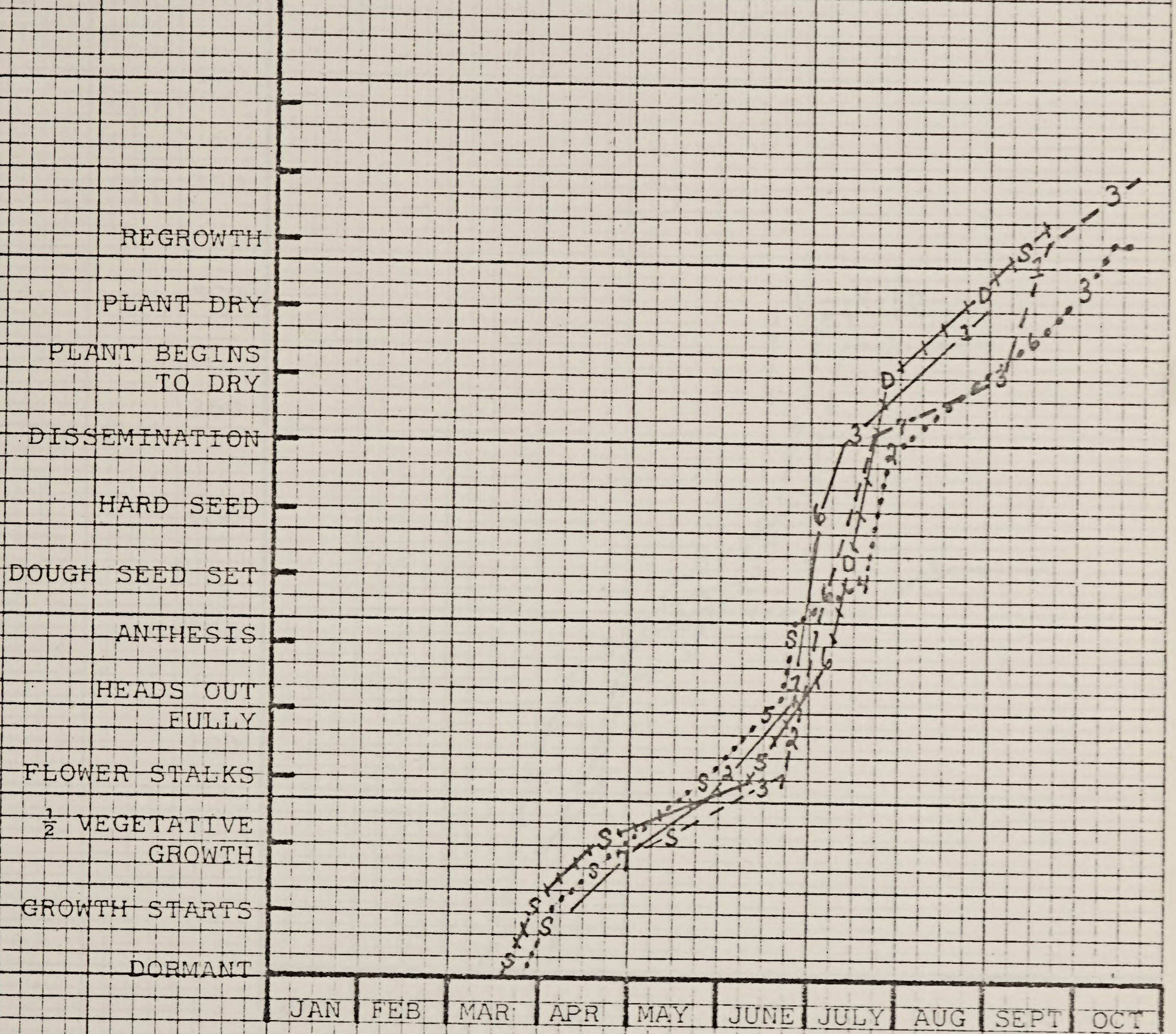


Fig. 3. Phenology of Sitanion hystrix compared to soil moisture depth (inches) on northern desert shrub vegetation type (site 01-3), Elko District.

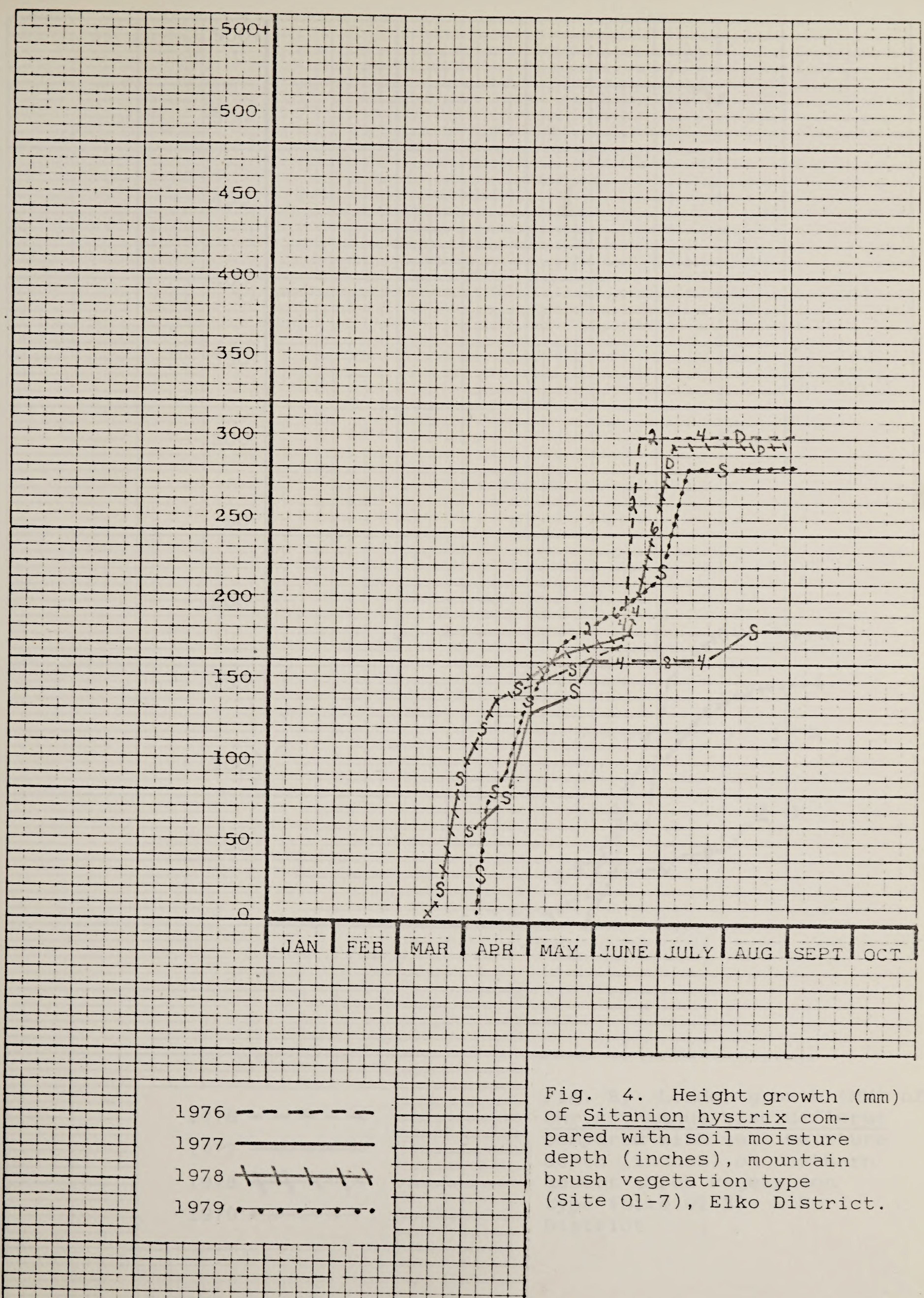


Fig. 4. Height growth (mm) of Sitanion hystrix compared with soil moisture depth (inches), mountain brush vegetation type (Site 01-7), Elko District.

BATTLE
WINNEMUCCA
CARSON CITY (NORTH)

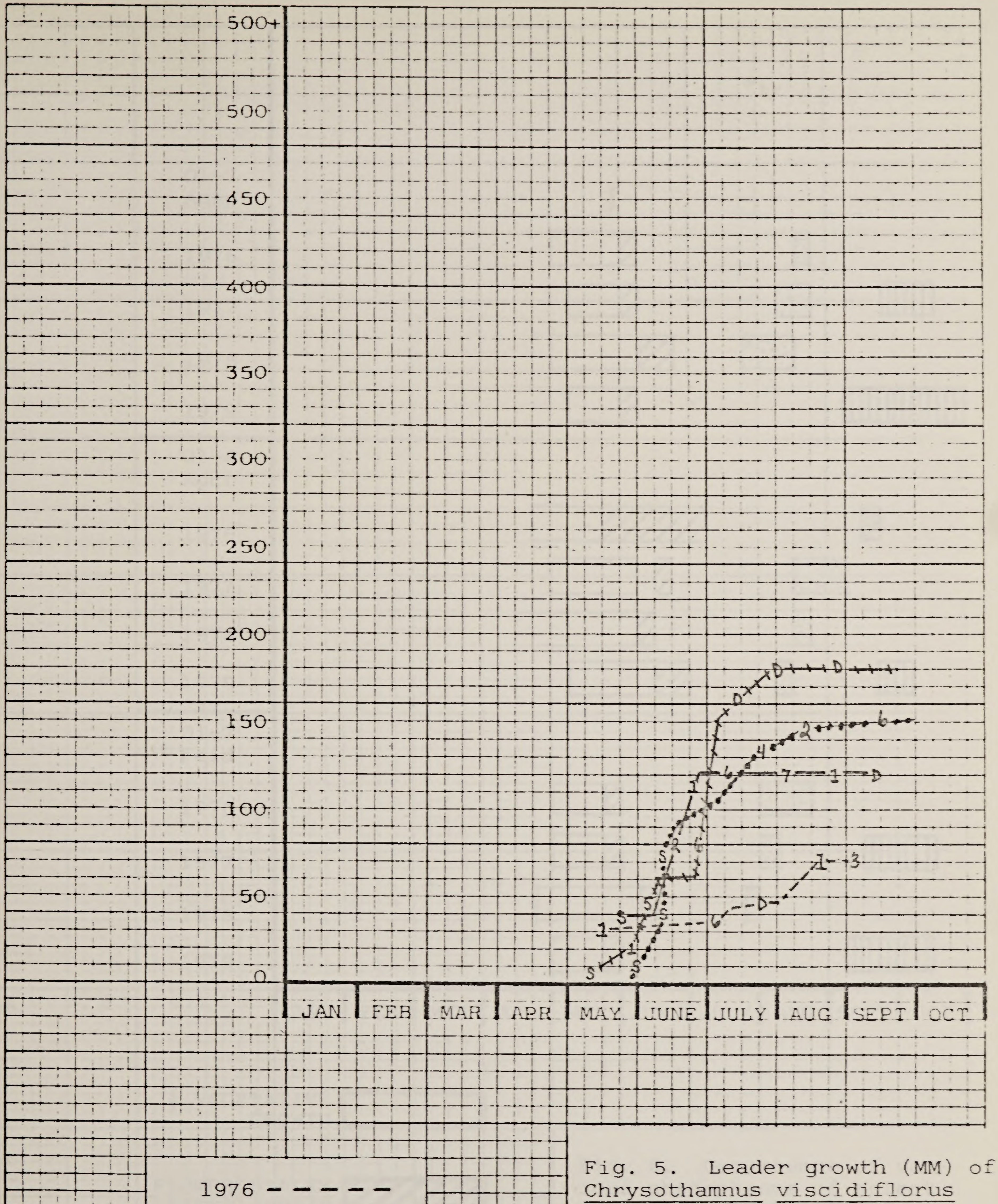


Fig. 5. Leader growth (MM) of Chrysothamnus viscidiflorus compared with soil moisture depth (inches) on northern desert shrub vegetation type (site 01-3), Elko District.

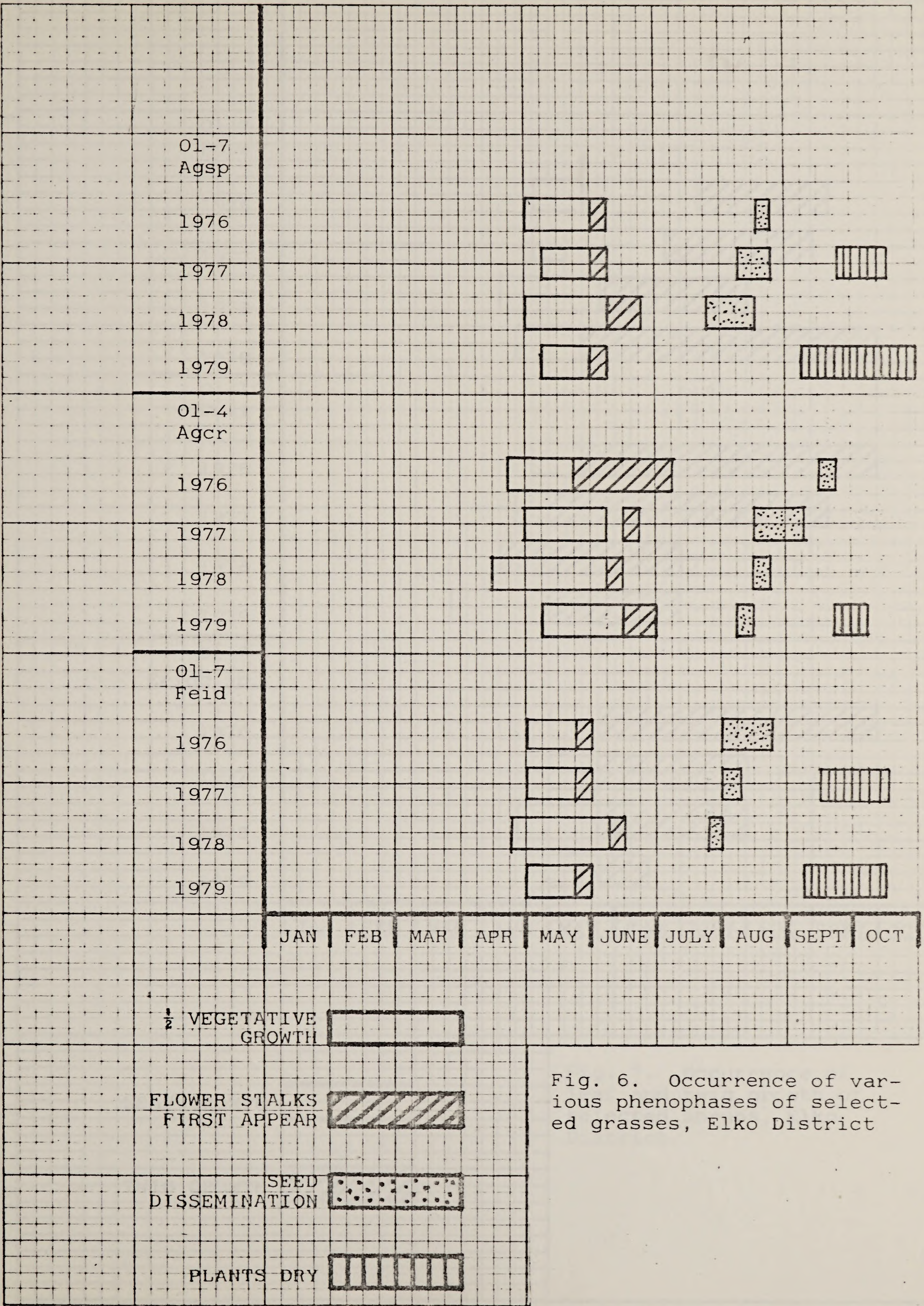


Fig. 6. Occurrence of various phenophases of selected grasses, Elko District

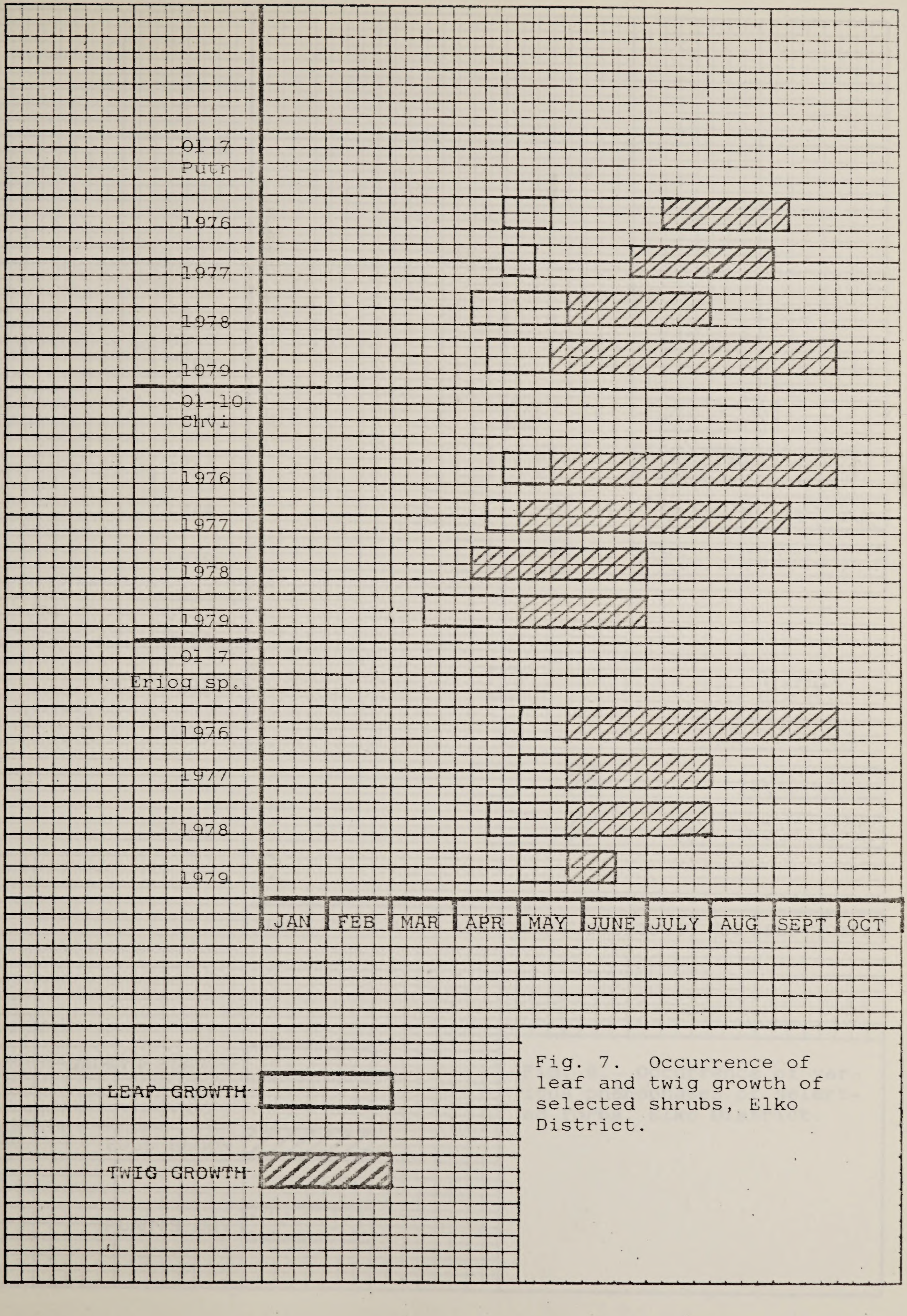


Fig. 7. Occurrence of leaf and twig growth of selected shrubs, Elko District.

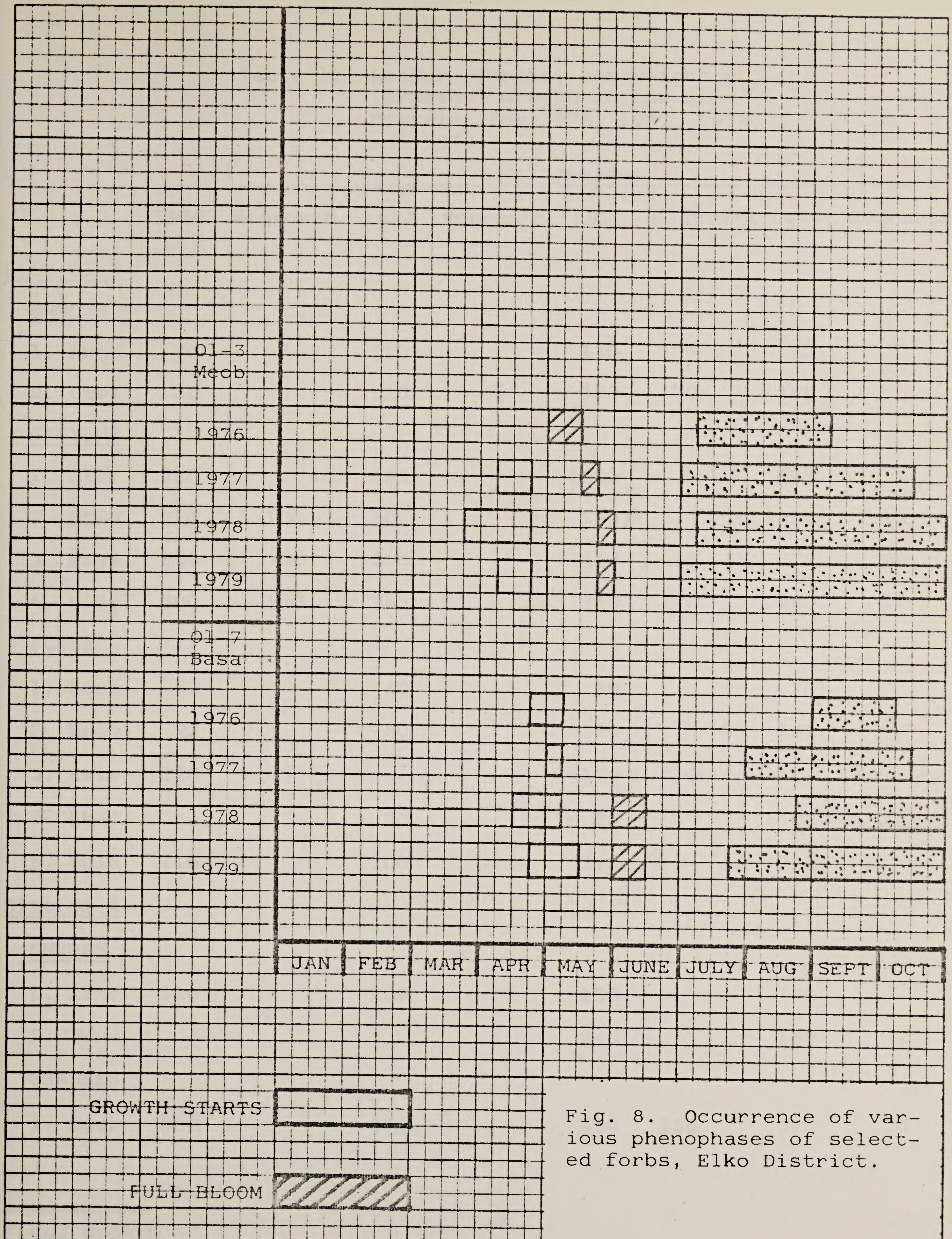


Fig. 8. Occurrence of various phenophases of selected forbs, Elko District.

Table 1. Leader (Shrubs) and Height (Grasses) Growth in the Elko District for 1976, 1977, 1978, and 1979.

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 01-3 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 70 | | 110 | | 140 | | 92 | |
| 2. Chvi | 70 | | 120 | | 180 | LG* | 148 | |
| GRASSES | | | | | | | | |
| 1. Elci | 750 | | 820 | | 1000 | | 805 | |
| 2. Stwe | 220 | 100 | 200 | | 250 | | 222 | 12 |
| 3. Posa | 300 | 60 | 200 | | 230 | 95 | 379 | 60 |
| 4. Sihy | 300 | 100 | 240 | | 250 | 130 | 280 | 12 |
| FORBS | | | | | | | | |
| 1. Lone | 50 | | 40 | | 80 | | 72 | |
| 2. Meob | 92 | | 80 | | 120 | | 131 | |
| 3. Asle | 110 | | | | 170 | 10 | 85 | |
| 4. Phdi | | | 50 | | 50 | 9 | 23 | |
| 5. Lule | 110 | | 100 | | 210 | | 220 | |
| Site 01-4 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 110 | | 200 | | 150 | | 140 | |
| 2. Chnac | | | | | 240 | | 160 | |
| GRASSES | | | | | | | | |
| 1. Agcr | 380 | | 370 | | 450 | 155 | 370 | 70 |

---

*Leaf growth

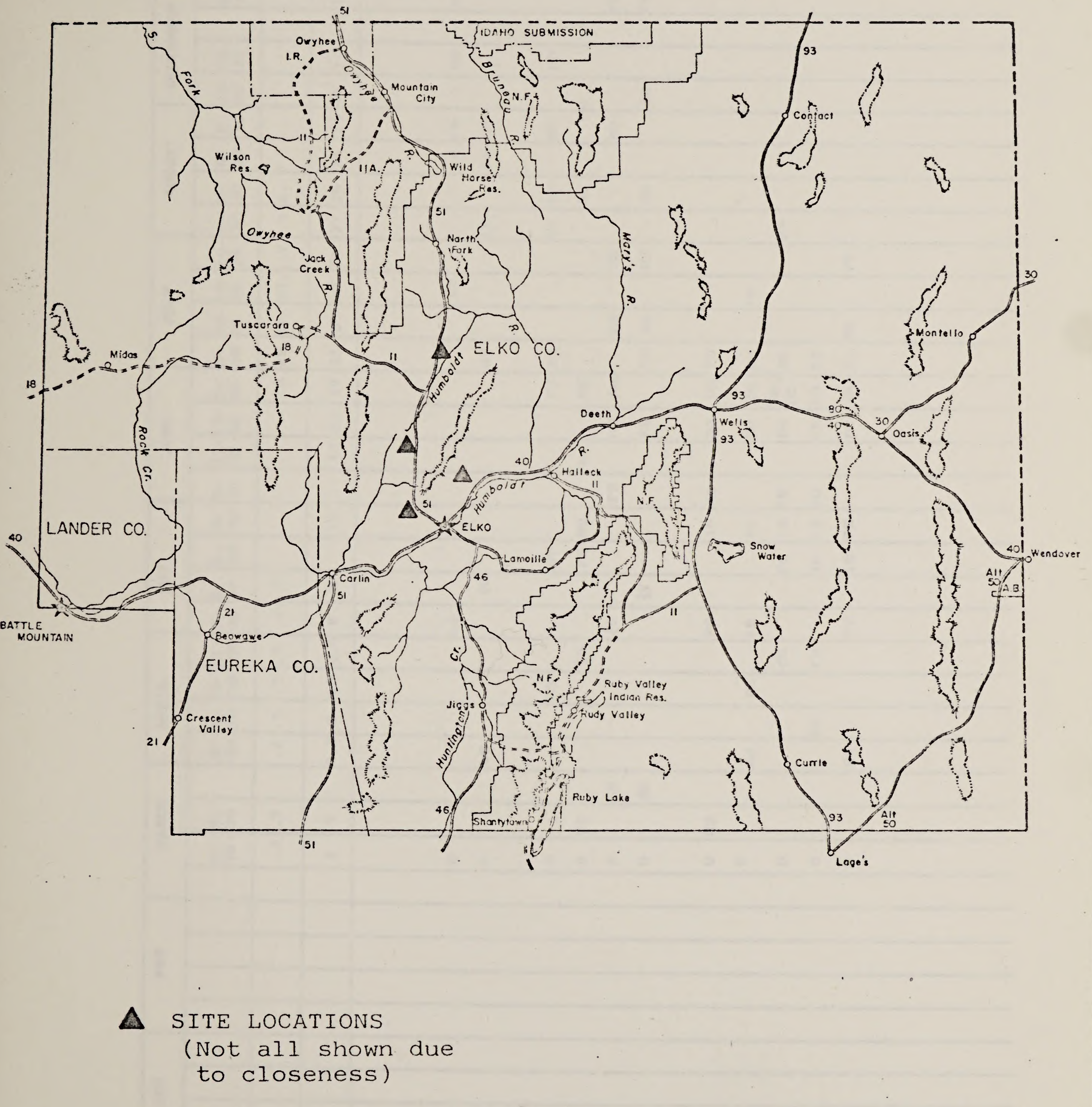
| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 01-4 Con't. | | | | | | | | |
| 2. Sihy | 200 | | 210 | | 2310 | 100 | 185 | 20 |
| 3. Posa | 200 | | 230 | | 140 | 55 | 320 | |
| FORBS | | | | | | | | |
| 1. Phlox sp. | 30 | | 90 | | 25 | 2 | 30 | |
| 2. Rate | | | | | 25 | | 27 | |
| Site 01-6 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Saal | 1000 | | 470 | | 370 | | 138 | |
| GRASSES | | | | | | | | |
| 1. Cane | 650 | | 450 | | 550 | | 650 | |
| 2. Juba | 740 | | 570 | | 600 | | 635 | |
| 3. Agst | | | 540 | | 900 | | 246 | 35 |
| 4. Popr | | | 450 | | 800 | | 625 | 22 |
| 5. Brin | | | 760 | | 1130 | | 635 | 30 |
| FORBS | | | | | | | | |
| 1. Migu | 220 | | | | 450 | | 245 | |
| 2. Rumex sp. | 700 | | 670 | | 920 | | 461 | 30 |
| 3. Mear | | | 250 | | 540 | | 366 | |
| Site 01-7 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 210 | | 160 | | 205 | | 84 | |
| 2. Putr | 70 | | 110 | | 135 | | 64 | |
| 3. Chvi | 220 | | 140 | | 150 | | 151 | |

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 01-7 Con't. | | | | | | | | |
| 4. Rosa sp. | 90 | | 100 | | 80 | | 62 | |
| 5. Arar | 150 | | 110 | | 200 | | 130 | |
| 6. Chnac | 200 | | 210 | | 270 | | 166 | |
| 7. Amut | | | 50 | | 122 | | 60 | |
| GRASSES | | | | | | | | |
| 1. Feid | 570 | | 480 | | 460 | 100 | 517 | 8 |
| 2. Elci | 1230 | | 960 | | 1350 | | 1131 | |
| 3. Posa | 350 | 50 | 230 | | 300 | 70 | 372 | 10 |
| 4. Agsp | 610 | 100 | 530 | | 450 | 105 | 710 | |
| 5. Sihy | 300 | 100 | 180 | | 300 | 125 | 370 | 12 |
| 6. Stth | 470 | 70 | 230 | | 450 | | 450 | |
| 7. Brte | | | | | 140 | 55 | 190 | |
| FORBS | | | | | | | | |
| 1. Meob | 180 | | 100 | | 160 | | 195 | |
| 2. Basa | 600 | | 270 | | 450 | | 410 | |
| 3. Maca | 260 | | | | 400 | | 256 | 20 |
| 4. Ragl | | | | | 90 | | 105 | |
| 5. Lupin sp. | | | | | 320 | | 400 | |
| 6. Eriog sp. | 270 | | 100 | | 150 | | 210 | |
| Site 01-10 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 140 | | 190 | | 290 | | 189 | |
| 2. Chvi | 100 | | 160 | | 150 | LG* | 122 | LG* |
| 3. Tegl | | | | | | | 100 | |

---

* Leaf growth

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| **01-10 Con't.** | | | | | | | | |
| **GRASSES** | | | | | | | | |
| 1. Brte | 320 | 100 | 160 | | 380 | 55 | 300 | 2 |
| 2. Elci | 1330 | | 940 | | 1600 | | 1160 | |
| 3. Agda | | | 510 | | 550 | 130 | 421 | |
| 4. Posa | | | 300 | | 115 | | 215 | |
| **FORBS** | | | | | | | | |
| 1. Sial | 250 | | 310 | | 750 | 10 | 430 | |
| 2. Erci | 90 | 20 | 140 | | 300 | 30 | 110 | |



▲ SITE LOCATIONS
(Not all shown due
to closeness)

# ELKO DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | S-30 | S-30 | | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | 11-30 | 13-30 | S-30 | S-30 | 10-35 | 10-35 | 10-35 | 6-30 | 5-30 | 6-30 | 6-30 | 16-30 | 16-30 | | S-30 | | 8-30 | | | | | | |
| SM Blocks (all readings are minus) | | | | | | | | | | .3 | .3 | | .2 | .3 | .3 | .3 | .4 | .5 | | | | | | .8 | 25. | 22. | 20. | .2 | .3 | 4. | | | | | | | | 11.5 | | .6 | | | | |
| S.T.,°C | | | | | | | | | | 1 | 5 | | 2,5 | 2 | 4.5 | 4.5 | 8 | 8 | | 13 | | 15 | 21 | 19 | 22 | 25 | 20 | 27 | 27 | 25 | 24 | 25 | 16 | 14 | | 15 | | 9 | | 1 | | | | |
| ELKO 01-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | D | | | | | | | LG | | | TG | | | | | | | BV | | | | 1B | FB | | BO | | SR | | SD | | LY | | | | |
| Chvi | | | | | | | | | | D | | | LG | | | | | TG | | | | | | | BV | | | | 1B | | FB | BO | | | | | | SD | | LY | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Elci | | | | | | | | | | D | | | | | GS | | | | ½V | | | | | FS | An | | | | DS | SD | | BD | | PD | | | | | | | | | | |
| Posa | | | | | | | | | | D | GS | | | | | ½V | | | FS | HO | | An | | DS | | | | | | BD | | PD | | | | | | GS | | | | | | |
| Sihy | | | | | | | | | | D | | GS | | | | | ½V | | | | FS | | HO | An | | DS | | SD | | | | BD | | | | PD | | GS | | | | | | |
| Stwe | | | | | | | | | | D | | GS | | | | | | ½V | | | | | FS | | HO | An | | DS | | SD | | | BD | | | PD | | GS | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asle | | | | | | | | | | D | GS | | | | | | FS | | | 1B | Fb | | BO | DS | PD | | | | | | | | | | | | | | | | | | | |
| Lone | | | | | | | | | | D | | | GS | | FS | | 1B | | | BO | | | SR | DS | BD | | PD | | | | | | | | | | | | | | | | | |
| Lule | | | | | | | | | | D | | | | | | GS | | | FS | 1B | FB | | BO | SR, DS | BD | | | | PD | | | | | | | | | | | | | | | |
| Meob | | | | | | | | | | D | | | | GS | | FS | | | 1B | FB | BO | | SR | DS | PD | | | | | | | | | | | | | | | | | | | |
| Phdl | | | | | | | | | | D | | | GS | | | | FS | | 1B | FB | | | BO | SR | DS | BD | | PD | | | | | | | | | | | | | | | | |

CARSON CITY (NORTH)

CARROLL SUMMIT

WINNEMUCCA

BATTLE

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | 0-30 | 0-30 | | 0-30 | 0-30 | 0-30 | 2-30 | S-30 | | S-30 | S-30 |
| SM Blocks (All readings are minus) | | | | | | | | | | .3 | .3 | | .3 | .3 | .3 | .5 | .4 | .3 | | |
| S.T.-°C | | | | | | | | | | 1 | 3 | | 2.5 | 3 | 5.5 | 6.5 | 7.5 | 7 | 18 | 16 |
| ELKO 01-4 | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | D | | | | | | | LG | | TG | |
| Chnac (var.) | | | | | | | | | | D | | | | | LG | | | | TG | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | |
| Agcr | | | | | | | | | | D | | | GS | | | | | ½V | | |
| Posa | | | | | | | | | | D | GS | | | | | | ½V | | FS | HO |
| Sihy | | | | | | | | | | D | | | GS | | | | | ½V | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | |
| Phlox sp. | | | | | | | | | | D | | | GS | | | | | | FS | 1B |
| Rate | | | | | | | | | | D | | | | | | GS | FS | | 1B | |

| SYMBOL 1979 | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | S-30 | 13-30 | 18-30 | 8-30 | 10-30 | 10-30 | 10-30 | 10-30 | 10-30 | 10-30 | 10-30 | 10-30 | 16-30 | 18-30 | | S-30 | | 12-30 | | S-30 | | | | |
| SM Blocks (All readings are minus) | | | | | | | | | | 4. | 3. | | | | | | | 6.5 | | .6 | | | | |
| S.T.-°C | 20 | 17 | 27 | 20 | 24 | 25 | 26 | 30 | 30 | 27 | 25 | 22 | 18 | 16 | | 14 | | 12 | | 1 | | | | |
| ELKO 01-4 | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | BV | | | | | | FG | 1B | FB | | | | SR | | SD | | | | | | |
| Chnac (var.) | | | | | | | BV | | 1B | | FB | | | | | BO | | SD | | LY | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | |
| Agcr | | | FS | | HO | | | | | SD | BD | | | | | PD | | GS | | | | | | |
| Posa | | An | | DS | HS | | | | | BD | | | PD | | | | | | | | | | | |
| Sihy | FS | | HO | An | DS | BD | | PD | | | | | | | | | | | | GS | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | |
| Phlox sp. | FB | | BO | SR | BD | | | PD | | | | | | | | | | | | | | | | |
| Rate | FB | BO | DS | BD | PD | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | 0-30 | 0-30 | | 0-30 | 0-30 | 0-30 | S-30 | | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S-34 | S-36 | S-36 | S-36 | 5-36 | 5-35 | 5-30 | 6-30 | 6-30 | 12-30 | 14-30 | | S-30 | | S-30 | | | | | | |
| SM Blocks (All readings are minus) | | | | | | | | | | .2 | .2 | | .2 | .2 | .2 | .2 | .2 | | | | | | .1 | 5.5 | .2 | .2 | .3 | .4 | | 3. | 4. | | | | | .2 | | .2 | | | | | | |
| S.T.-°C | | | | | | | | | | 3.5 | 3.5 | | 3.5 | 5 | 5 | 7 | 8 | 18 | 16 | 14 | 11 | 14 | 15 | 16 | 19 | 18 | 20 | 20 | 23 | 25 | 26 | 24 | 14 | 12 | | 12 | | 10 | | | | | | |
| ELKO 01-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Saal | | | | | | | | | | D | | | | | | LG | | | | TG | | | | | | | | | BV | | | FG | | | | 1B | | FB | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agst | | | | | | | | | | D | | | | GS | | | | | ½V | | | | | FS | | HO | | | | An | | SD | | BD | | | | GS | | | | | | |
| Brin | | | | | | | | | | D | | | GS | | | | | | ½V | | | | | | | | | FS | HO | SD | | BD | | PD | | | | GS | | | | | | |
| Cane | | | | | | | | | | D | | | GS | | | | | | ½V | | FS | | HO | AH | | | | DS | HS | SD | BD | | | | | PD | | | | | | | | |
| Juba | | | | | | | | | | D | | | | GS | | | | ½V | | | FS | | HO | | An | HS | | | | | | SD | BD | | | PD | | | | | | | | |
| Popr | | | | | | | | | | GS | | | | | | | | ½V | FS | HO | | | | | | An | | | | SD | BD | | | PD | | | | GS | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mear | | | | | | | | | | D | | | | | | | | GS | | | | | | | | | FS | | 1B | FB | BO | DS | BD | | | PD | | | | | | | | |
| Migu sp. | | | | | | | | | | D | | | | | | GS | | | FS | 1B | | | BO | SH | | | | | DS | | | | BD | | | PD | | | | | | | | |
| Rumex sp. | | | | | | | | | | D | | | | GS | | | | | | | | | | FS | | 1B | | FB | | BO | SR | DS,<br>BD | PD | | | | | GS | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | S-30 | S-30 | | S-30 | S-30 | S-30 | S-30 | S-30 | | S-30 | S-30 | S-30 | 7-30 | 15-30 | S-30 | S-30 | 10-30 | 10-30 | 10-30 | 10-30 | 7-30 | 10-30 | 10-30 | 12-30 | 15-30 | | S-30 | | 12-30 | | | | | |
| SM Blocks (all readings are minus) | -- | -- | -- | -- | -- | S | n | o w | ---0 | --- | --- | --- | --- | .2 | .2 | .2 | .2 | .1 | | | | | 0 | 0 | 2.5 | 0 | 0 | 8.5 | 8. | 7. | 5. | 0 | 0 | 0 | | 30. | | 5. | | 0 | | | |
| S.T.-$^{o}$C | -- | -- | -- | -- | -- | S | n | o w | --- | --- | --- | --- | --- | 2 | 5 | 6 | 11 | 7.5 | 14 | 21 | 14 | 20 | 18 | 16 | 28 | 25 | 27 | 20 | 23 | 25 | 24 | 26 | 15 | 11 | | 12 | | 10 | | 0 | | | |
| ELKO 01-7-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amut | | | | | | | | | | D | | | | | | LG | | | TG | BV | 1B | FB | | BO | | | SR | SD | | | | LY | | | | | | | | LG | | | |
| Artr | | | | | | | | | | D | | | | | | | LG | | | | | TG | | | | | | | | BV | 1B | FB | | BO | | SR | | SD | | LY | | | |
| Chnac | | | | | | | | | | D | | | | | | LG | | | | TG | | | | | | BV | | | 1B | FB | | | BO | | | SD | | LY | | | | | |
| Chvi | | | | | | | | | | D | | | | | LG | | | | | TG | | | | | | | BV | | 1B | FB | | | BO | SR | | LY | | LG | | | | | |
| Putr | | | | | | | | | | D | | | | | LG | | | | TG | BV | FG | 1B | | FB | BO | | | SR | | | SD | | | | | | | LY | | | | | |
| Rosa | | | | | | | | | | D | | | | | | | LG | | | TG | | | | BV | FG | FB | | BO | | | SR | | | SD | | LY | | LD | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Elci | | | | | | | | | | D | | | | | GS | | | | | ½V | | | | FS | HO | | | An | | SD | | BD | | | | | | PD | | | | | |
| Feid | | | | | | | | | | D | | | | GS | | | ½V | | | FS | HO | | | | | An | | DS | | BD | | | | PD | | | | | | GS | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maca | | | | | | | | | | D | | | | | GS | | | | | | | | | FS | | 1B | | | | FB | BO | DS | BD | PD | | | | GS | | | | | |
| Meob | | | | | | | | | | D | | | | | | GS | FS | | 1B | FB | | BO | | SR | PD | | | | | | | | | | | | | | | | | | |
| Eriog sp. | | | | | | | | | | D | | | | | | | GS | | | FS | | | 1B | | | | FB | SR | | DS | BD | PD | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | 0-30 | 0-30 | | 0-30 | 0-30 | 0-30 | S-30 | 1-30 | 1-30 | 1-30 | 1-30 | 5-30 | 11-30 | 16-30 | S-30 | S-30 | S-30 | S-35 | S-30 | S-30 | S-30 | 6-30 | 6-30 | 10-30 | 16-30 | | S-30 | | 20-30. | | | | | | |
| SM Blocks (All readings are minus) | --- | --- | --- | --- | --- | S | N | O | W -- | Sn | 6n | | .2 | .3 | .3 | .5 | .7 | .11 | | | | | 0 | .2 | 11. | 60. | 50. | 7. | 7. | 4. | 4. | 0 | 0 | 0 | | 0 | | 8.5 | | .6 | | | | |
| S.T.-°C | --- | --- | --- | --- | --- | S | N | O | W - | Sn | Sn | | 1.5 | 2.5 | 7 | 9 | 14 | 8 | 16 | 25 | 21 | 23.5 | 21 | 21 | 20 | 30 | 30 | 32 | 30 | 28 | 27 | 25 | 25 | 18 | | 22 | | 16 | | 20 | | | | |
| ELKO 01-7-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arar | | | | | | | | | | D | | | | | | | LG | | TG | | | | | | | | | BV | | FG | FB | | | BO | | SD | | LD | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agsp | | | | | | | | | | D | | | GS | | | | | ½V | | | FS | HO | | | | | An | HS | | BD | | | | PD | | | | | | | | | | |
| Brte | | | | | | | | | | D | | | GS | | | | | | ½V | FS | HO | An | | DS | | BD | | | PD | | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | D | | | GS | | | ½V | | | FS | HO | | An | | DS | HS | | | SD | BD | | | PD | | | | | | | | GS | | | | |
| Sihy | | | | | | | | | | D | | | GS | | | | ½V | | | | | FS | | HO | | An | DS | SD | | | BD | PD | | | | | | | | GS | | | | |
| Stth | | | | | | | | | | D | | | GS | | | | | ½V | | FS | | HO | | | | An | HS | | SD | | | BD | | PD | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Basa | | | | | | | | | | D | | | | | | GS | | | FS | 1B | FB | | BO | SR | | BD | | PD | | | | | | | | | | | | | | | | |
| Lupin sp. | | | | | | | | | | D | | | | | | GS | | | FS | | 1B | FB | | BO | | SR | DS | BD | PD | | | | | | | | | | | | | | | |
| Ragl | | | | | | | | | | D | | | FS | 1B | FB | | BO | | | SR | | PD | | | | | | | | | | | | | | | | | | | | | | |

BATTLE MOUNTAIN

WINNEMUCCA

CARROLL SUMMIT

CARSON CITY (NORTH)

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | 0-30 | 0-30 | | 0-30 | .5-30 | 0-30 | S-30 | | | S-30 | S-30 | S-30 | 17-30 | 20-30 | S-30 | S-30 | 15-30 | 15-30 | 15-30 | 15-30 | 10-30 | 6-30 | 10-30 | 18-30 | 18-30 | | S-30 | | 10-30 | | | | | | |
| SM Blocks (All readings are minus) | | | | | | | | | | .2 | .2 | | .2 | .2 | .4 | .5 | 1.5 | | 0 | 0 | 3. | 0 | 0 | 8.5 | 30. | 0 | 0 | 0 | 0 | 6. | 5. | 0 | 0 | 0 | | .3 | | 3. | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | 7 | 3 | | 6 | 9.5 | 5 | 14 | 19 | | 14 | 24 | | 245 | 20 | 19 | 30 | 30 | 23 | 25 | 26 | 24 | 26 | 24 | 22 | 18 | | 18 | | 11 | | | | | | |
| ELKO 01-10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | D | | | | | | | LG | | | TG | | | | | | | | BV | | FG | 1B | FB | | | | BO | | SR | | | | | | |
| Chvi | | | | | | | | | | LG | | | | | | | TG | | | | | | | | BV | | | | 1B | FB | | | BO | SR | | SD | | LG | | | | | | |
| Tegl | | | | | | | | | | | D | | | LG | | | | | TG | | | BV | | | | | | FG | | 1B | FB | BO | SR | | | SD | | LY | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agda | | | | | | | | | | D | GS | | | | | | | | ½V | | | | | FS | HO | An | | DS | | HS | SD | BD | PD | | | | | | | | | | | |
| Brte | | | | | | | | | | GS | | | | | | ½V | FS | | HO | | An | | HS | SD | BD | | | | PD | | | | | | | | | GS | | | | | | |
| Elci | | | | | | | | | | D | | | | | GS | | | | ½V | | | | FS | HO | | An | | | DS | | HS | SD | BD | | | | | | | | | | | |
| Posa | | | | | | | | | | GS | | | | | ½V | | FS | | HO | | DS | | HS | SD | | | | BD | | | | | PD | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Erci | | | | | | | | | | GS | | | | | | | FS | | | | 1B | FB | BO | SR | DS | PD | | | | | | | | | | | | | | | | | | |
| Sial | | | | | | | | | | GS | | | | | | | | | FS | | 1B | | FB | BO | | SR | | | | DS | | BD | PD | | | | | | | | | | | |

BATTLE

WINNEMUCCA

CARROLL
SUMMIT

CARSON CITY
(NORTH)

## WINNEMUCCA

The grass species development depicted in Figures 1 and 2 show considerable variability among years. The greatest variability seems to be associated with seed dissemination. No one year seems to be the earliest or latest for this phenophase.

Height growth of the annual cheatgrass (*Bromus tectorum*) varied significantly among years with 1977 producing the least growth (Figure 3). By comparison, the leader growth of green rabbitbrush (*Chrysothamnus viscidiflorus*) shows less variability, although 1979 shows the least growth (Figure 4).

The phenology of bud sagebrush (*Artemisia spinescens*), snowberry (*Symphoricarpos longiflorus*) and squirreltail grass (*Sitanion hystrix*) show similarity in their developmental curves (Figures 5, 6 and 7). Bud sagebrush showed the tightest pattern when comparing the four years of the study. Squirreltail grass developed up to three weeks earlier in 1976 and 1979. Most perennial grass species had completed considerable growth by 1979 - mid-April.

Leader growth data for all species was difficult to interpret (Table 1). In general, no one year showed significantly greater growth when compared with the other three years. Their data should be compared with climatic data to enhance their interpretability.

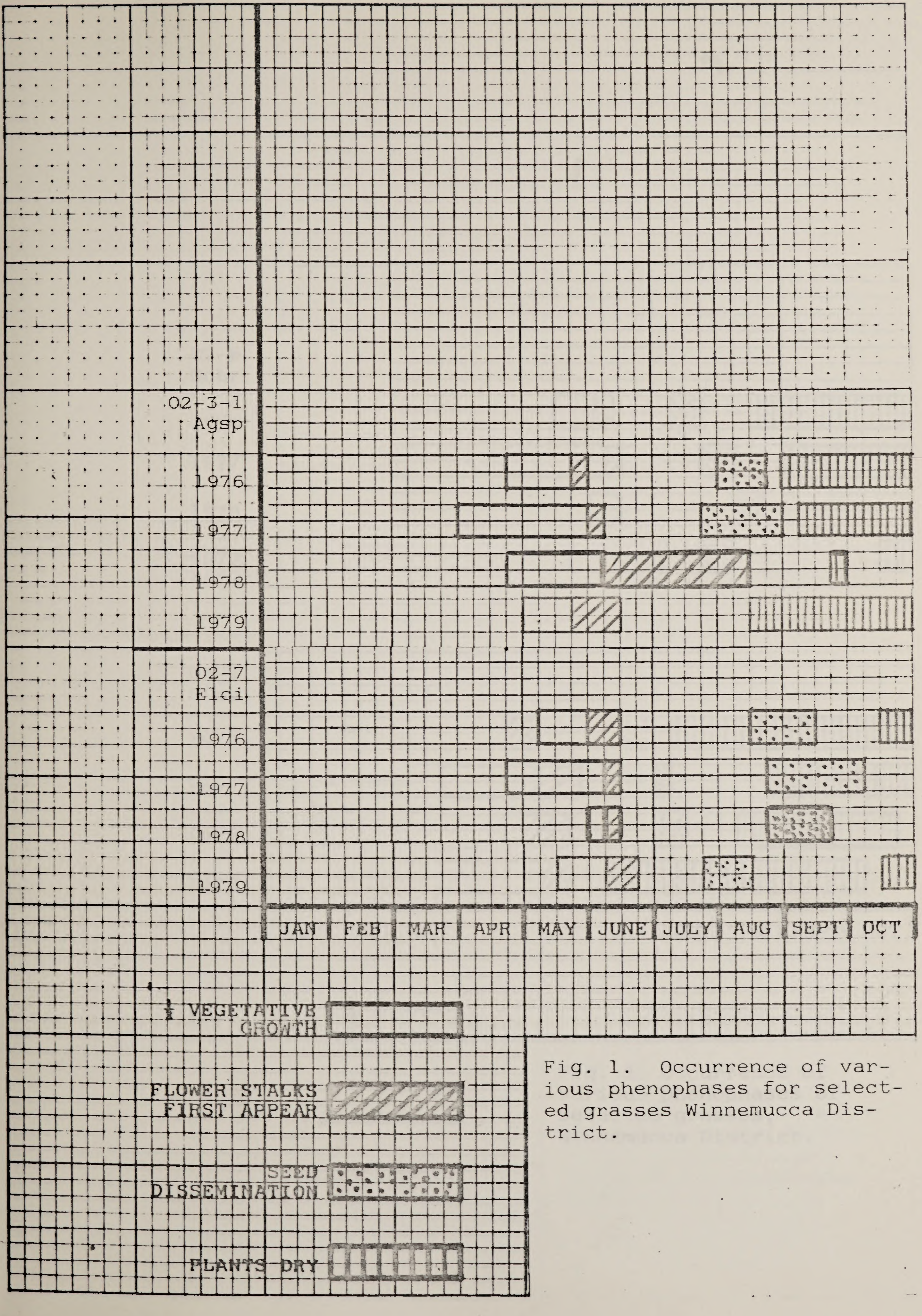


Fig. 1. Occurrence of various phenophases for selected grasses Winnemucca District.

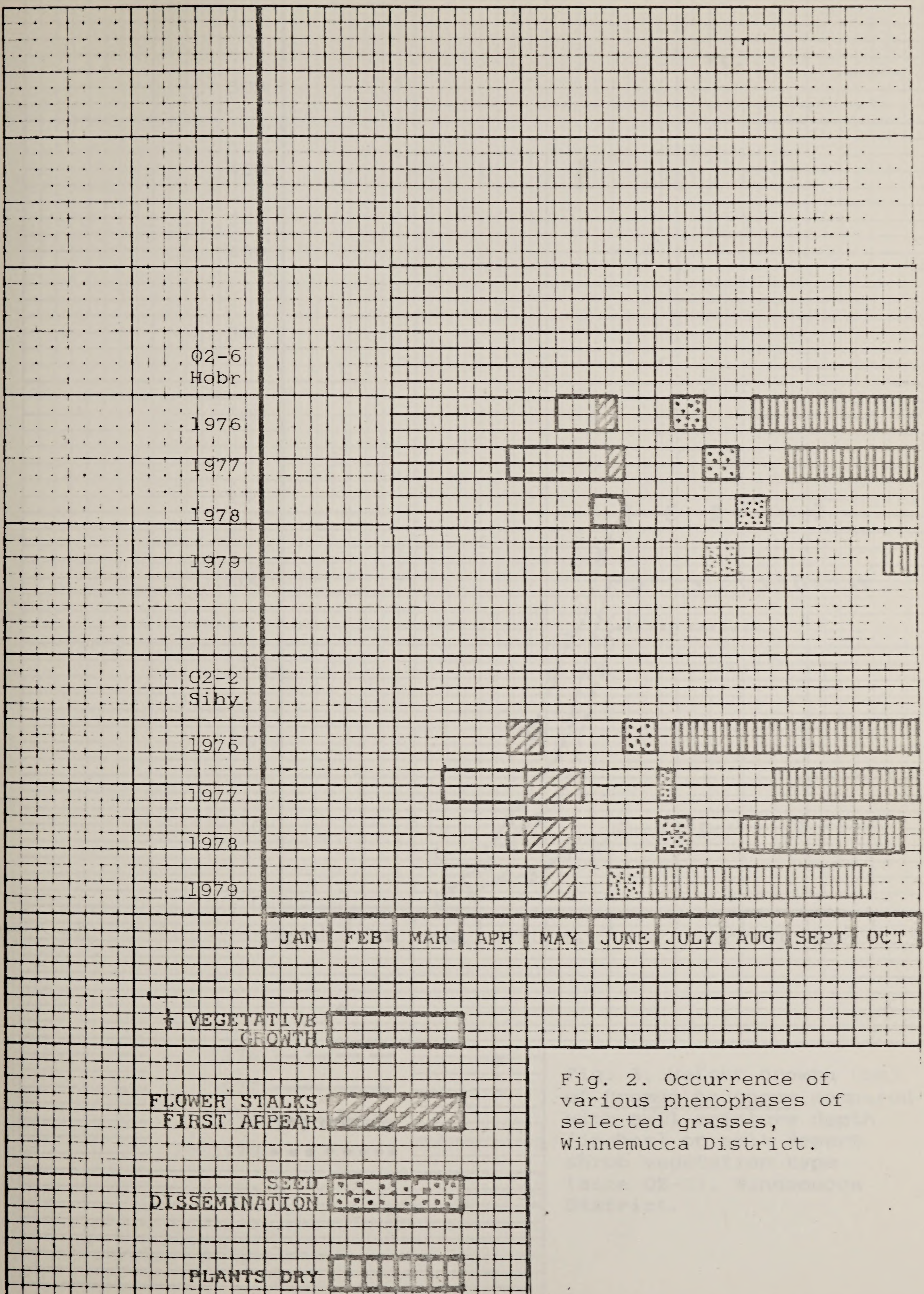
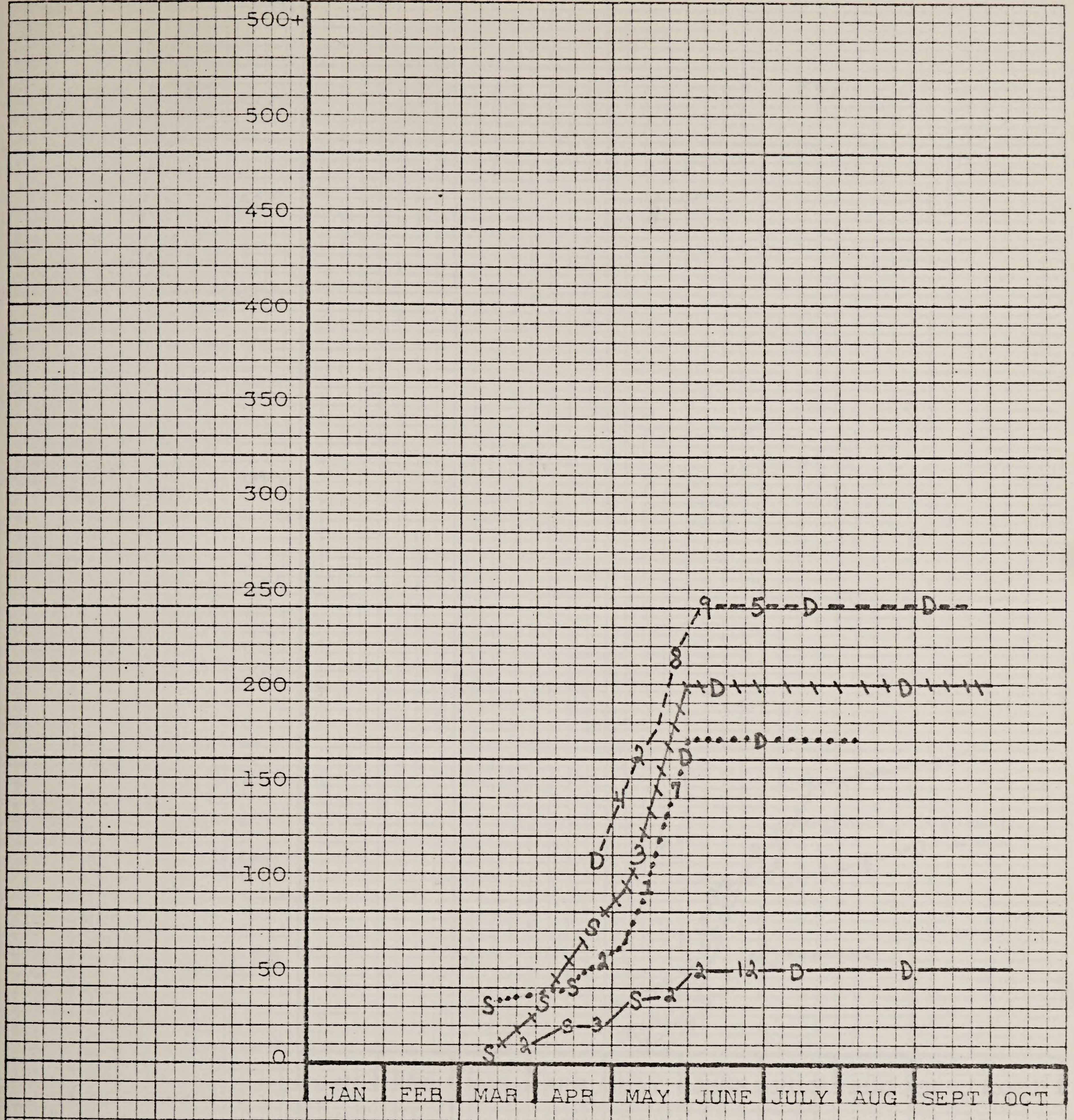


Fig. 2. Occurrence of various phenophases of selected grasses, Winnemucca District.



1976 — — — —
1977 ————
1978 ┼┼┼┼┼┼┼
1979 • • • • • • • •

Fig. 3. Height growth (mm) of Bromus tectorum compared with soil moisture depth (inches) on salt desert shrub vegetation type (site 02-2), Winnemucca District.

BATTLE
CARROLL SUMMIT
CARSON CITY (NORTH)

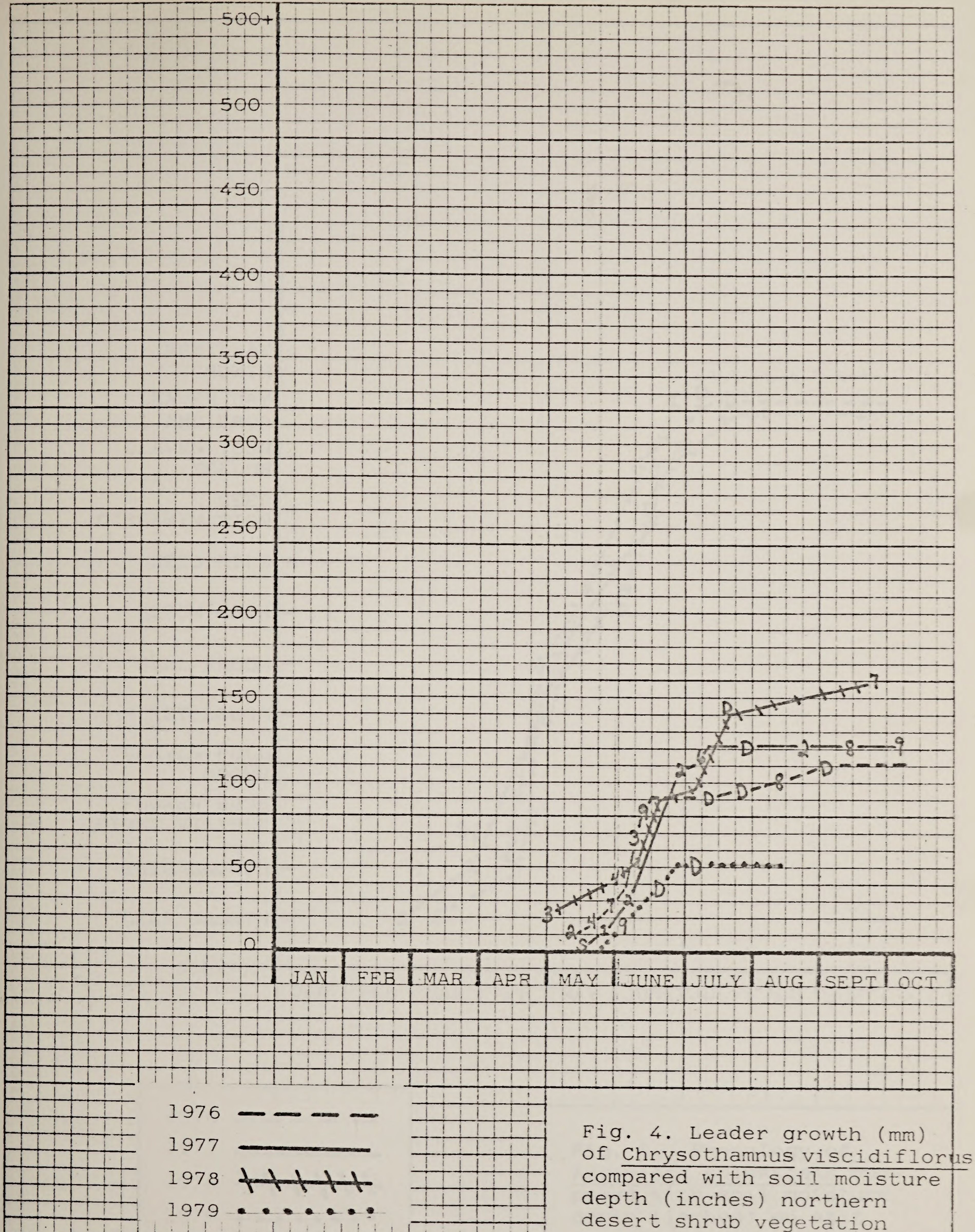


Fig. 4. Leader growth (mm) of Chrysothamnus viscidiflorus compared with soil moisture depth (inches) northern desert shrub vegetation type (site 02-3-2), Winne-mucca District

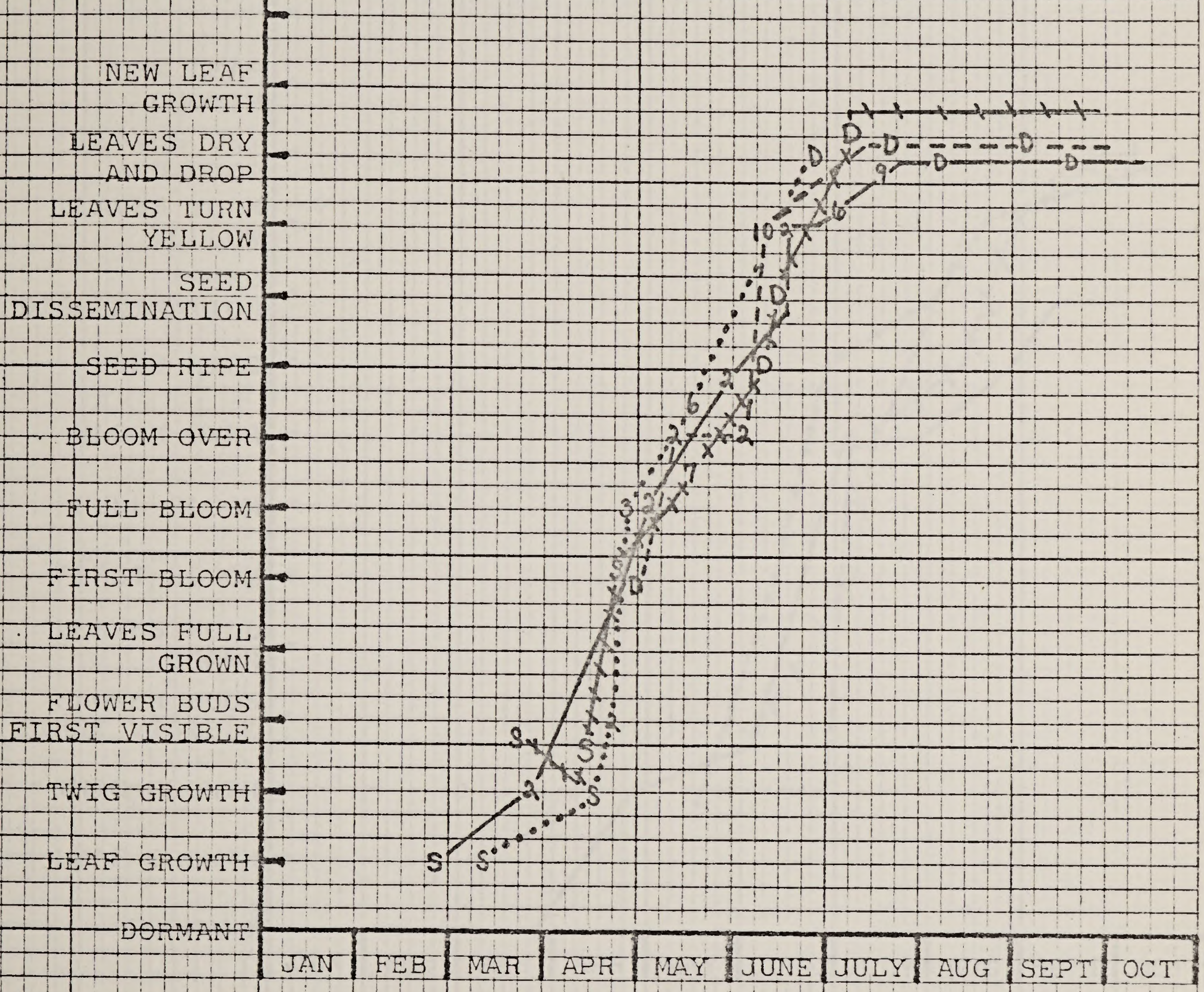


Fig. 5. Phenology of Artemisia spinescens compared with soil moisture depth (inches) on salt desert shrub vegetation type (site 02-2), Winnemucca District.

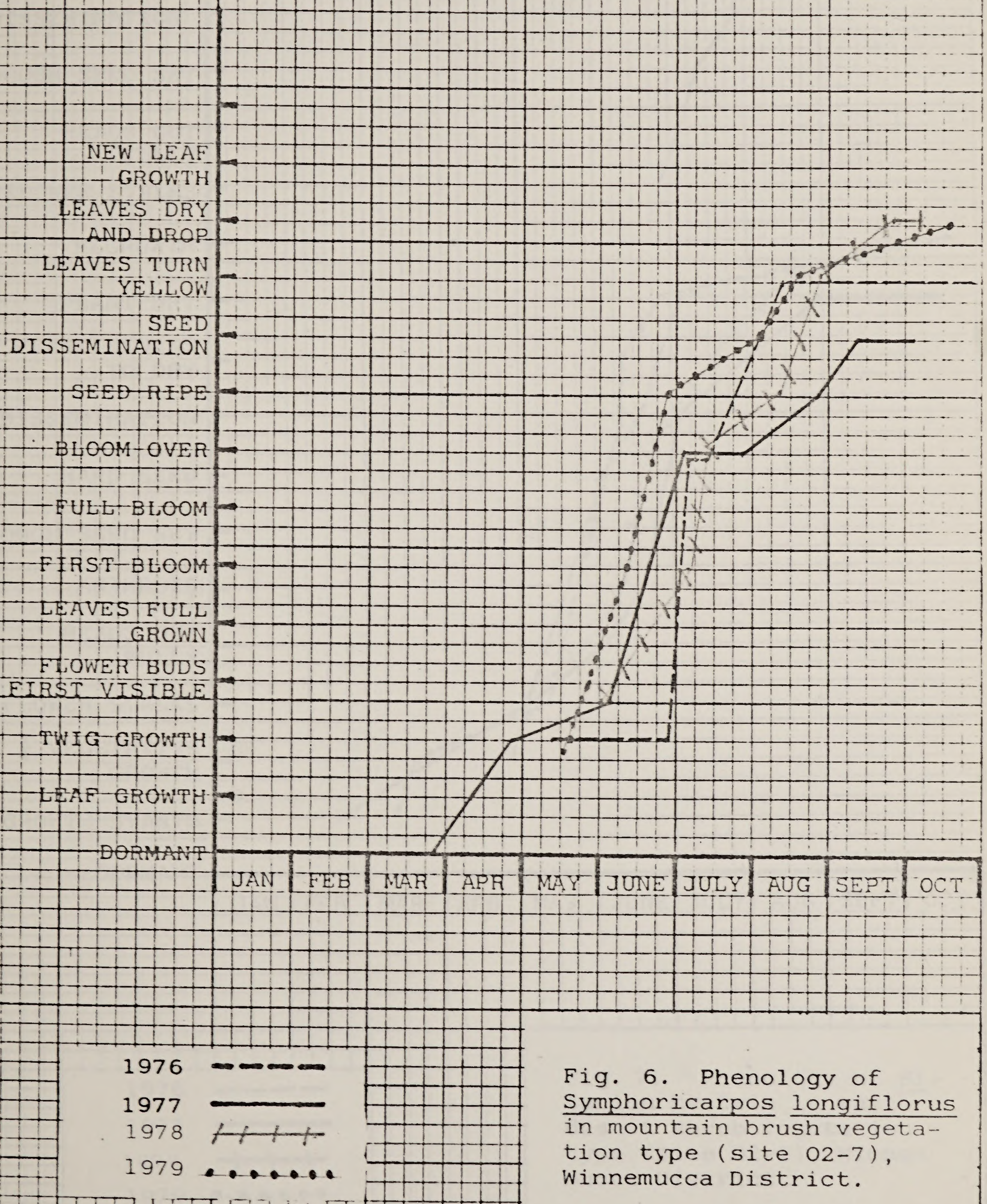


Fig. 6. Phenology of *Symphoricarpos longiflorus* in mountain brush vegetation type (site 02-7), Winnemucca District.

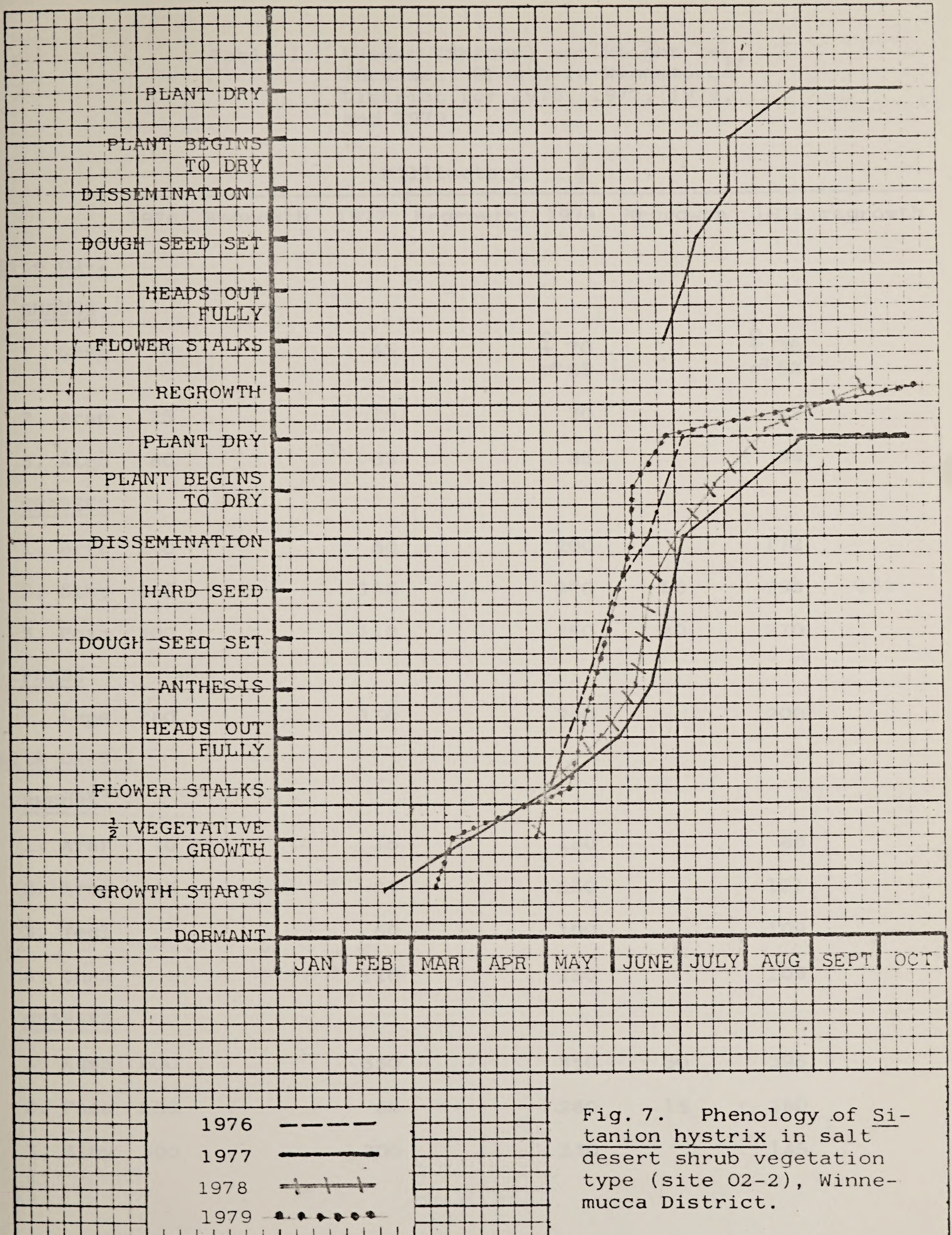


Fig. 7. Phenology of *Sitanion hystrix* in salt desert shrub vegetation type (site 02-2), Winnemucca District.

Table 1. Leader (Shrubs) and Height (Grasses) Growth in Winnemucca District for 1976, 1977, 1978, and 1979.

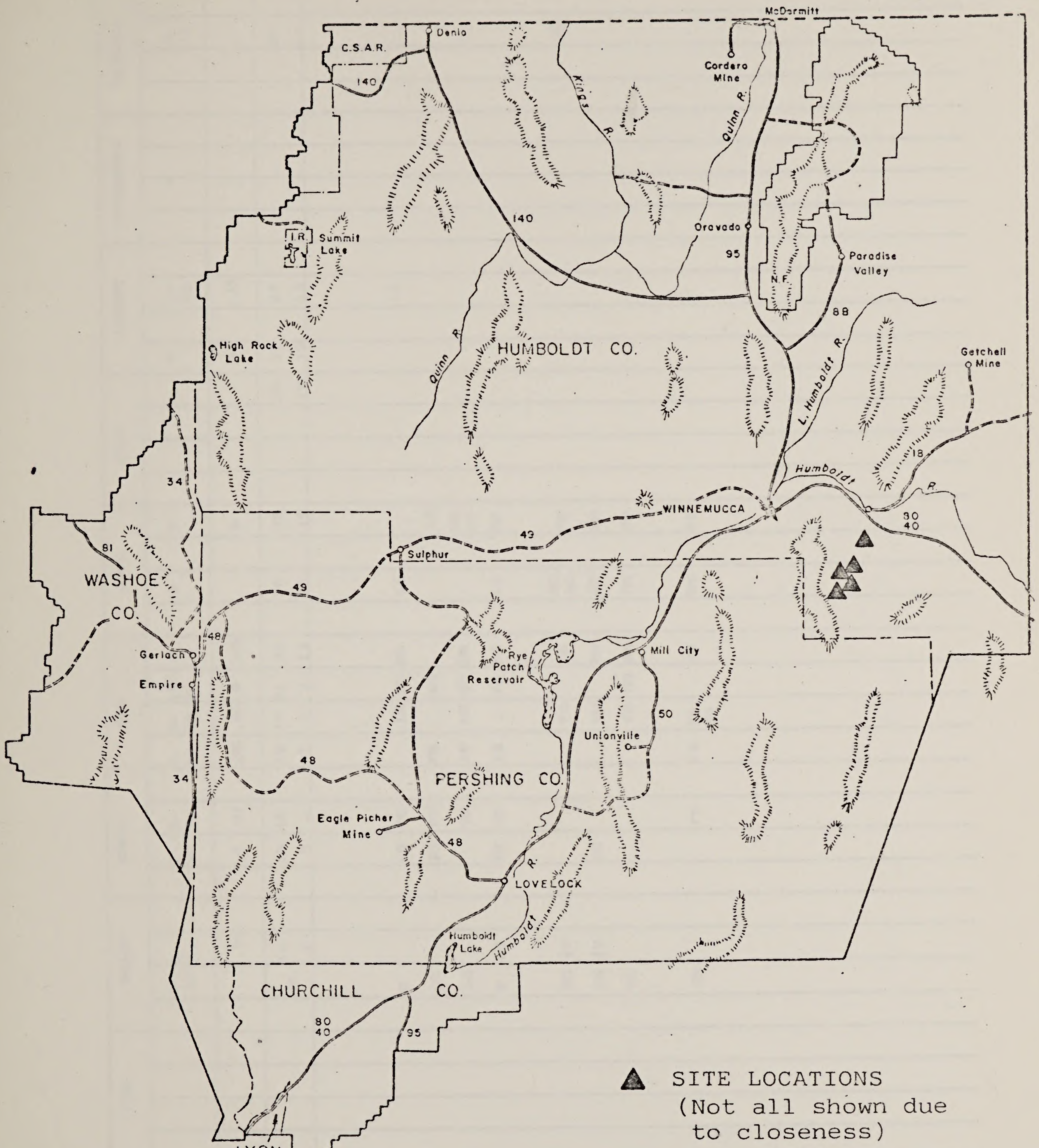
Millimeters

| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | regrowth |
|---|---|---|---|---|---|---|---|---|
| Site 02-2 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Grsp | 70 | | 45 | | ♀ 70<br>♂ 55 | | ♀ 36<br>♂ 52 | |
| 2. Arsp | 25 | | 15 | | 30 | | 29 | |
| 3. Atco | 80 | | 53 | | 85 | | 39 | |
| GRASSES | | | | | | | | |
| 1. Brte | 240 | | 50 | | 200 | | 172 | |
| 2, Sihy | 240 | | 135 | | 270 | 50 | 295 | 132 |
| 3. Posa | 300 | | 110 | | 260 | 20 | 270 | |
| FORBS | | | | | | | | |
| 1. Lepe | 180 | | 150 | | 200 | | 200 | |
| Site 02-3-1 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Arar | 70 | | 15 | | 180 | | 85 | |
| 2. Artr | 45 | | 27 | | 230 | | 121 | |
| 3. Tegl | | | 60 | | 100 | | 109 | |
| 4. Chna | | | 110 | | 130 | | 109 | |
| GRASSES | | | | | | | | |
| 1. Agsp | 600 | | 330 | | 350 | 30 | 395 | |
| 2. Posa | 200 | | 63 | | 280 | 15 | 280 | |
| 3. Sihy | 300 | | 200 | | 230 | | 145 | |

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 02-3-1 Con't. | | | | | | | | |
| 4. Brte | 200 | 80 | 90 | | 190 | 10 | 138 | |
| 5. Stth | | | 80 | | 200 | 10 | 145 | 56 |
| FORBS | | | | | | | | |
| 1. Luca | 180 | | 55 | | 300 | | 305 | |
| 2. Crac | 190 | | 160 | | 120 | | 255 | |
| 3. Phho | 50 | | 6 | | 100 | | 86 | |
| 4. Casti sp. | 200 | | 180 | | 180 | | 267 | |
| 5. Astra sp. | | | 65 | | 50 | | 112 | |
| Site 02-3-2 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Chvi | 110 | | 120 | | 160 | | 51 | |
| 2. Tegl | 70 | | 65 | | 100 | | 56 | |
| 3. Atco | | | 50 | | 110 | | 35 | |
| 4. Arsp | | | 15 | | 30 | | 13 | |
| 5. Artr | | | 20 | | 220 | | 109 | |
| GRASSES | | | | | | | | |
| 1. Posa | | | 30 | 70 | 280 | 20 | 282 | |
| 2. Sihy | | | 165 | | 260 | 40 | 248 | 84 |
| 3. Brte | | | 20 | 70 | 180 | 30 | 181 | |
| FORBS | | | | | | | | |
| 1. Phho | 50 | | 2 | | 40 | | 84 | |
| Site 02-6 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Salix sp. | 140 | | 155 | | 110 | | ♀ 52<br>♂ 64 | |

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 02-6 Con't. |  |  |  |  |  |  |  |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Pobu | 250 |  | 55 |  | 340 |  | 102 |  |
| 2. Hobr | 450 |  | 100 |  | 500 |  | 358 |  |
| 3. Juncu sp. | 400 |  | 300 |  | 300 |  | 468 |  |
| 4. Carex sp. | 120 |  | 100 |  | 160 |  | 308 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Taof | 85 |  | 75 |  | 150 |  | 262 |  |
| 2. Iris sp. | 500 |  | 450 |  | 400 |  | 510 |  |
| 3. Acla | 300 |  | 290 |  | 340 |  | 311 |  |
| 4. Veca | 1000 |  | 650 |  | 600 |  |  |  |
| 5. Cirsi sp. |  |  | 460 |  | 400 |  | 705 |  |
| Site 02-7 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Amal | 45 |  | 9 |  | 30 |  | 130 |  |
| 2. Arar | 170 |  | 15 |  | 140 |  | 157 |  |
| 3. Sylo | 70 |  | 130 |  | 80 |  | 45 |  |
| 4. Hodi | 60 |  | 73 |  | 85 |  | 125 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Agsp | 610 |  | 400 |  | 500 |  | 445 |  |
| 2. Elci | 1200 |  | 880 |  | 1220 |  | 990 |  |
| 3. Posa | 400 |  | 75 |  | 270 | 20 | 252 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Pesi | 60 |  |  |  | 70 |  |  |  |
| 2. Phho | 40 |  | 14 |  | 80 |  | 12 |  |
| 3. Luca | 400 |  | 250 |  | 360 |  | 228 |  |

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 02-7 Con't. | | | | | | | | |
| 4. Zigad sp. | | | 250 | | 250 | | | |
| 5. Haplo sp. | | | 12 | | 60 | | 85 | |
| Site 02-11 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Riau | 90 | | 105 | | 180 | | 152 | |
| 2. Rowo | 110 | | 63 | | 100 | | 116 | |
| 3. Artr | 120 | | 50 | | 280 | | 162 | |
| 4. Prvi | 160 | | 120 | | 120 | | 17 | |
| 5. Chna | | | 185 | | 180 | | 185 | |
| 6. Salix sp. | | | 210 | | 120 | | ♀ 135<br>♂ 130 | |
| 7. Potr | | | 90 | | 260 | | 142 | |
| GRASSES | | | | | | | | |
| 1. Posa | 310 | | 97 | | 280 | 20 | 292 | |
| 2. Pobu | 330 | | 125 | | 400 | | 405 | |
| 3. Elci | | | 700 | | 990 | | 891 | |
| 4. Brte | | | 180 | | 200 | 30 | 205 | |
| 5. Carex sp. | | | 85 | | 130 | | 116 | |
| FORBS | | | | | | | | |
| 1. Erci | 60 | | 80 | | 80 | | 47 | 28 |
| 2. Cirsi sp. | | | 580 | | 140 | | 575 | 28 |
| 3. Arlu | | | 400 | | 370 | | 506 | |
| 4. Iris sp. | | | 480 | | 580 | | 640 | |



▲ SITE LOCATIONS
(Not all shown due
to closeness)

# WINNEMUCCA DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | S-30 | S-30 | | | 1-30 | 6-30 | | 7-30 | 3-25 | 15-30 | D | | D | | D | | | | | D | | 1-15 | | | | | | | | S-12 | | | | | |
| Precip. (in) | | | | | | | | | | | .55 | | | .3 | .07 | | .36 | .56 | 0 | .05 | | | | 0 | | | | | 0 | | 1.15 | | | | | | | | | | | | | |
| S.T.-°C Maximum | | | | | | | | | | 7 | 10 | | | 13 | 16 | | 19 | 17 | 21 | 25 | | 26 | | 25 | | | | 26 | 27 | | 27 | | | | | | | | 26 | | | | | |
| Minimum | | | | | | | | | | | 4 | | | 3 | 4 | | 7 | 7 | 7 | 13 | | 16 | | 16 | | | | 19 | 19 | | 16 | | | | | | | | 14 | | | | | |
| WINNEMUCCA 2-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Atco | | | | | | | | | | D | | | | LG | TG | | | 1B | FB | BO | | LY | | | | | | | | | LD | | | | | | | | | | | | | |
| Arsp | | | | | | | | | | LG | | | | TG | BV | | FB | | BO | | | | | LD | | | | | | | | | | | | | | | | | | | | |
| Grsp ♀ | | | | | | | | | | LG | | | | | TG | | 1B | FB | BO | SR | | | | SD,<br>LD | | | | | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | D | LG | | | BV | TG | | 1B | . | FB | BO | | LY | | LD | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | GS | ½V | | | | | | | FS | | DS | | SD,<br>BD | | PD | | | | | | | | | | | | | | | GS | | | | | |
| Posa | | | | | | | | | | GS | ½V | | | FS | | | | HO | | An | | BD | | PD | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | GS | | | | | | | | FS | HO | DS | | HS | | PD | | | | | | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lepe | | | | | | | | | | GS | | | | | FS | | FB | FB,<br>BD | | SR | | DS | | PD | | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S-30 | | | S-30 | 2-30 | | 2-30 | 2-30 | 4-30 | 9-30 | | 10-30 | | D | | | | 4-27 | D | | 4-28 | | | | | | | | S-4 | | | | | |
| Precip. (in) | | | | | | | | | | | | | | .8 | .2 | | .51 | 1.22 | 0 | .04 | | 0 | | 0 | | | | .98 | 0 | | 1.02 | | | | | | | | .85 | | | | | |
| S.T.-$^oC$ Maximum | | | | | | | | | | | | | | | | | 16 | 7 | 18 | 16 | | 18 | | 33 | | | | | | | | | | | | | | | | | | | | |
| Minimum | | | | | | | | | | | | | | | | | | | | | | | | 18 | | | | | | | | | | | | | | | | | | | | |
| WINNEMUCCA 02-3-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | D | | | | | | | TG | | | | | | BV | | | | | | | | | | | | | | | SR | | | | | |
| Arar | | | | | | | | | | | D | | | | | | | TG | | | | | | BV | | | | | 1B | | | | | | | | | | SD | | | | | |
| Tegl | | | | | | | | | | | D | | | LG | | | | TG | BV | | | | | | | | * | LY | LD | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | | | LG | | | | | TG | | | | | | | | | BV | | | | | | | | | | | SR | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agsp | | | | | | | | | | | GS | | | | | | $\frac{1}{2}$V | | | FS | | An | | | | | | BD | | | PD | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | | | | | | $\frac{1}{2}$V | | FS | | | | SD,<br>BD | | | | PD | | | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | | GS | | | | | | FS | HO | | An | | DS | | SD,<br>PD | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | GS | | | | | | | FS | | An | | DS | | SD,<br>PD | | | | | | | | | | | | | | | | | | | | |
| Stth | | | | | | | | | | | GS | | | | | | | $\frac{1}{2}$V | | An | | DS | | SD | | | | BD | | | PD | | | | | | | | GS | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phho | | | | | | | | | | | GS | | | | | | FS | 1B | FB | | | BO | | DS | | | | PD | | | | | | | | | | | | | | | | |
| Crac | | | | | | | | | | | D | | | GS | | | | | FS | | | FB | | PD | | | | | | | | | | | | | | | | | | | | |
| Casti sp. | | | | | | | | | | | GS | | | | | | FS | FB | | | | BO | | DS,<br>PD | | | | PD | | | | | | | | | | | | | | | | |
| Luca | | | | | | | | | | | GS | | | | | | FS | FB | | BO | | SR | | PD | | | | | | | | | | | | | | | | | | | | |
| Astra sp. | | | | | | | | | | | GS | | | | | | FS | FB | | | | SR | | DS,<br>PD | | | | PD | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN |  |  |  | FEB |  |  |  | MARCH |  |  |  | APRIL |  |  |  | MAY |  |  |  | JUNE |  |  |  | JULY |  |  |  | AUGUST |  |  |  | SEPTEMBER |  |  |  | OCTOBER |  |  |  | NOVEMBER |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) |  |  |  |  |  |  |  |  |  | S-<br>50 | S-<br>30 |  |  | S-<br>30 | 1-<br>30 |  | 4-<br>30 | 2-<br>30 | 8-<br>30 | 22-<br>30 |  | D<br>0 |  | D<br>0 |  |  |  | 2-<br>13 | D |  | 1-<br>15 |  |  |  |  |  |  |  | S-<br>12 |  |  |  |  |  |
| Precip. (in) |  |  |  |  |  |  |  |  |  |  | .59 |  |  | .4 | .09 |  | .69 | .51 | 1.29 | .02 |  | 0 |  | 0 |  |  |  | .8 | 0 |  | 1.34 |  |  |  |  |  |  |  | .38 |  |  |  |  |  |
| S.T.-°C Maximum |  |  |  |  |  |  |  |  |  | 8 | 14 |  |  | 14 | 16 |  | 17 | 17 | 22 | 29 |  | 29 |  | 26 |  |  |  | 28 | 28 |  | 27 |  |  |  |  |  |  |  | 24 |  |  |  |  |  |
| Minimum |  |  |  |  |  |  |  |  |  |  | 2 |  |  | 2 | 4 |  | 4 | 6 | --- | 13 |  | 13 |  | 18 |  |  |  | 20 | 23 |  | 16 |  |  |  |  |  |  |  | 13 |  |  |  |  |  |
| WINNEMUCCA 2-3-2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SHRUBS: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Atco |  |  |  |  |  |  |  |  |  | D |  |  |  |  |  |  |  | LG,<br>TG |  | 1B |  | FB |  | BO |  |  |  | LY |  |  |  |  |  |  |  |  |  |  | LD |  |  |  |  |  |
| Arsp |  |  |  |  |  |  |  |  |  | LG |  |  |  | TG |  |  | 1B | FB |  | BO |  |  |  | LD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Artr |  |  |  |  |  |  |  |  |  | D |  |  |  |  |  |  |  | LG,<br>TG |  |  |  |  |  | BV |  |  |  |  | LY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Tegl |  |  |  |  |  |  |  |  |  | D |  |  |  | LG |  |  |  |  | TG | BV |  |  |  | FB,SR,<br>SD |  |  |  | LD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Chvi |  |  |  |  |  |  |  |  |  | D |  |  |  | LG |  |  |  | TG |  |  |  |  |  | BV |  |  |  | FB<br>LY |  |  | FB,<br>LD |  |  |  |  |  |  |  | LD |  |  |  |  |  |
| GRASSES: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Posa |  |  |  |  |  |  |  |  |  | GS |  |  |  | ½V |  |  | FS | HO |  | DS |  | HS |  | SD,<br>PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sihy |  |  |  |  |  |  |  |  |  | GS |  |  |  | ½V |  |  |  | FS |  | An |  | DS |  | SD,<br>PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  | GS |  |  |  |  |  |
| Brte |  |  |  |  |  |  |  |  |  | GS |  |  |  |  |  |  |  | FS |  | An |  | BD |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FORBS: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Phho |  |  |  |  |  |  |  |  |  | GS |  |  |  | 1B |  |  | FB |  |  | BO |  | SR |  | DS |  |  |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ruan |  |  |  |  |  |  |  |  |  | FS | FB |  |  | BO |  |  | SR | DS |  | gr. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | 1-30 | | 0-30 | | 3-30 | | | | 3-30 | 1-30 | | S-30 | | | | | | | | S-6 | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | O | | | | | |
| S.T.-°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WINNEMUCCA 02-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salix sp. ♀ | | | | | | | | | | | | | | | | | | | | TG,<br>BO | | | | | | | | LY | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | | | | | | | | | | | TG,<br>SD | | | | | | | | LY | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pobu | | | | | | M | U | D | | | | | | | | | | | | HO | | An | | DS,<br>BD | | | | SD | PD | | | | | | | | | | | | | | | |
| Hobr | | | | | | | | | | | | | | | | | | | | ½V | | | | DS | | | | SD,<br>BD | | | | | | | | | | | PD | | | | | |
| Carex sp. | | | | | | | | | | | | | | | | | | | | FS | | An | | DS | | | | HS | | | SD | | | | | | | | SD,<br>BD | | | | | |
| Juncu sp. | | | | | | | | | | | | | | | | | | | | HO | | An | | DS | | | | HS | | | SD | | | | | | | | BD | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Taof | | | | | | | | | | | | | | | | | | | | FB | | SR | | | | | | PD | | | | | | | | | | | | | | | | |
| Iris sp. | | | | | | | | | | | | | | | | | | | | GS | | FS | | SH | | | | | | | DS | | | | | | | | DS,<br>PD | | | | | |
| Acla | | | | | | | | | | | | | | | | | | | | GS | | FS | | FB | | | | DS,<br>BD | PD | | | | | | | | | | | | | | | |
| Cirsi sp. | | | | | | | | | | | | | | | | | | | | FS | | | | FB | | | | SR,<br>DS | BD | | | | | | | | | | PD | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | S-30 | 7-30 | | 9-30 | | | | | | 2-25 | D | | 2-30 | | | | | | | | | 3-6 | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | .94 | 0. | | 0 | | | | | | | | | 1.07 | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | 16 | 17 | | 15 | | | | | | 25 | 23 | | 17 | | | | | | | | | 14 | | | | | |
| WINNEMUCCA 02-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amal | | | | | | | | | | | | | | | | | | | LG, BV | TG, FB | | BO | | SR | | | | | LY | | | | | | | | | | | LD | | | | | |
| Hodi | | | | | | | | | | | | | | | | | | | LG | TG, BV | | | | 1B | | | | BO | LY | | | | | | | | | | | LD | | | | | |
| Sylo | | | | | | | | | | | | | | | | | | | TG | BV | | 1B | | SR | | | | | SD | | LY | | | | | | | | | LD | | | | | |
| Arar | | | | | | | | | | | | | | | | | | | LG | TG | | | | BV | | | | | | | 1B | | | | | | | | | SD | | | | | |
| GRASSES: | | | | | | M | U | D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agsp | | | | | | | | | | | | | | | | | | | ½V | | | FS | | An | | | | SD | BD | | | | | | | | | | | PD | | | | | |
| Elci | | | | | | | | | | | | | | | | | | | ½V | | | FS | | An | | | | HS, SD | SD, BD | | BD | | | | | | | | | PD | | | | | |
| Posa | | | | | | | | | | | | | | | | | | | FS | An | | DS | | HS SD | | | | SD, BD | SD, PD | | | | | | | | | | | PD | | | | | |
| Sihy | | | | | | | | | | | | | | | | | | | ½V | FS | | | | DS | | | | SD, BD | BD | | PD | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phho | | | | | | | | | | | | | | | | | | | FB | BO | | | | DS, BD | | | | PD | | | | | | | | | | | | | | | | | |
| Luca | | | | | | | | | | | | | | | | | | | FS | 1B | | | | BO, BD | | | | PD | | | | | | | | | | | | | | | | | |
| Pesi | | | | | | | | | | | | | | | | | | | 1B | FB | | SR | | | | | | DS | BD | | | | | | | | | | | | | | | | |
| Haplo sp. | | | | | | | | | | | | | | | | | | | GS | 1B | | FB | | SR, DS | | | | PD | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN |  |  |  | FEB |  |  |  | MARCH |  |  |  | APRIL |  |  |  | MAY |  |  |  | JUNE |  |  |  | JULY |  |  |  | AUGUST |  |  |  | SEPTEMBER |  |  |  | OCTOBER |  |  |  | NOVEMBER |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) |  |  |  |  |  |  |  |  |  | S-30 | S-30 |  |  | S-30 | 2-30 |  | 2 - 30 | S-30 | 4-30 | 7-30 |  | 7-30 |  | 20-30 |  |  |  | 2-24 | D |  |  | 1-29 |  |  |  |  |  |  |  |  |  |  |  |  |
| Precip. (in) |  |  |  |  |  |  |  |  |  |  |  |  |  | .85 | .19 |  | .59 | 1.3 | 0 | .04 |  | 0 |  | 0 |  |  |  | .90 | 0 |  |  | 1.38 |  |  |  |  |  |  |  |  |  |  |  |  |
| S.T.-°C Maximum |  |  |  |  |  |  |  |  |  | 5 | 2 |  |  |  | 13 |  | 16 | 17 | 21 | 22 |  | 24 |  | 27 |  |  |  | 27 | 28 |  |  | 28 |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2 |  | 6 | 6 | 15 | 12 |  | 12 |  | 16 |  |  |  | 17 | 21 |  |  | 5 |  |  |  |  |  |  |  |  |  |  |  |  |
| WINNEMUCCA 02-11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SHRUBS: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Salix sp. ♀ |  |  |  |  |  |  |  |  |  | D |  |  |  |  | BV |  |  | FB | TG, BO | SD |  |  |  |  |  |  |  |  | LY |  |  |  |  |  |  |  |  |  | LD |  |  |  |  |  |
| ♂ |  |  |  |  |  |  |  |  |  | D |  |  |  |  | BV |  |  | TG, 1B | FB | BO |  | SD |  |  |  |  |  |  | LY |  |  |  |  |  |  |  |  |  | LD |  |  |  |  |  |
| Prvi |  |  |  |  |  |  |  |  |  | D |  |  |  |  | LG |  | BV | TG |  | FB |  | BO |  | SR |  |  |  |  |  |  |  |  |  |  |  |  |  |  | LD |  |  |  |  |  |
| Chna |  |  |  |  |  |  |  |  |  | D |  |  |  | LG |  |  |  | TG |  |  |  |  |  |  |  |  |  | BV |  |  |  |  |  |  |  |  |  |  | SR |  |  |  |  |  |
| Chvi |  |  |  |  |  |  |  |  |  | D |  |  |  | LG |  |  |  | TG |  |  |  |  |  |  |  |  |  |  | FB |  |  |  |  |  |  |  |  |  | SR |  |  |  |  |  |
| Artr |  |  |  |  |  |  |  |  |  | D |  |  |  |  |  |  |  | LG, TG |  |  |  |  |  | BV |  |  |  |  |  |  |  |  |  |  |  |  |  |  | SR |  |  |  |  |  |
| Potr |  |  |  |  |  |  |  |  |  | D |  |  |  |  | LG |  | BV | TG |  | BO |  | SR |  | SD |  |  |  |  | LY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Riau |  |  |  |  |  |  |  |  |  | D |  |  |  | LG | BV |  | 1B | TG, FB |  | BO |  | SR |  |  |  |  |  |  | LY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rowo |  |  |  |  |  |  |  |  |  | D |  |  |  | LG |  |  |  | TG |  | BV |  | FB |  | FB |  | BO |  | SR |  |  |  |  |  |  |  |  |  |  | LD |  |  |  |  |  |
| GRASSES: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Posa |  |  |  |  |  |  |  |  |  | GS |  |  |  | ½V |  |  | FS | HO |  | An |  | DS |  | SD, PD |  |  |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sihy |  |  |  |  |  |  |  |  |  | GS |  |  |  |  |  |  | ½V |  |  | FS |  | HO |  | DS |  |  |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Elci |  |  |  |  |  |  |  |  |  | GS |  |  |  |  |  |  | ½V |  |  |  |  | FS |  | DS |  |  |  | SD, BD |  |  |  | BD |  |  |  |  |  |  | PD |  |  |  |  |  |
| Pobu |  |  |  |  |  |  |  |  |  | GS |  |  |  | ½V |  |  |  | FS |  | HO |  |  |  | DS |  |  |  | SD | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Winnemucca 02-11 con't | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grasses: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | GS | | | | | | | ½V | FS | | An | | DS | | SD,<br>PD | | | | PD | | | | | | | | | | | | | | | | |
| Carex sp. | | | | | | | | | | GS | | | | ½V | | | FS | HO | An | | | DS | | HS | | | | SD,<br>BD | | | | | | | | | | | PD | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Erci | | | | | | | | | | GS | | | | | FS | | 1B | BO | SR | DS | | | | PD | | | | | | | | | | | | | | | GS | | | | | |
| Cirsi sp. | | | | | | | | | | GS | | | | | | | | FS | | | | 1B | | FB | | | | SR,<br>DS | BD | | | | | | | | | | GS | | | | | |
| Clema sp. | | | | | | | | | | D | | | | | GS | | | | | FS | | | | FB | | | | SR,<br>DS | DS,<br>PD | | FB | | | | | | | | PD | | | | | |
| Arlu | | | | | | | | | | D | GS | | | | | | | | | | | FS | | | | | | BO,<br>SR, DS | DS,<br>BD | | BD | | | | | | | | | | | | | |
| Iris sp. | | | | | | | | | | GS | | | | | | | | | FS | 1B | | FB | | SR | | | | SR,<br>BD | DS,<br>PD | | | | | | | | | | | | | | | |

BATTLE
MOUNTAIN

CARROLL
SUMMIT

CARSON CITY
(NORTH)

## CARSON CITY

In this fourth year of data, big sagebrush (*Artemisia tridentata*) shows twig growth to be about average with previous years (Figure 1), as does the height growth for Indian ricegrass (*Oryzopsis hymenoides*; Figure 2).

Desert globemallow (*Sphaeralcea ambigua*; Figure 3) bloomed five weeks earlier in 1978 and 1979, but in 1979 it quickly dried and was completely dry six to ten weeks before other years. Although not shown on this graph, the soil seemed to dry in 1979 about the time the plant dried.

Indian ricegrass started its phenophases slightly earlier in 1979, but quickly finished and dried before other years (Figure 4). Squirreltail grass (*Sitanion hystrix*; Figure 5), appears to strike a medium in 1979 between the previous years.

The bar charts on Figures six through eight seem to show that 1979 mostly averaged in with the three previous years for selected phenophases. Twigs on low sagebrush (*Artemesia arbuscula*; Figure 6) grew for only five weeks, whereas in previous years twig growth lasted up to five months. Indian ricegrass (Figure 7) began to dry in early July of 1979, three to seven weeks earlier than previous years. This was probably a reflection of soil moisture dropping quicker than in other years.

An excellent array of plant height for grasses and forbs, and twig growth for shrubs is portrayed in Table 1. Considerable variation is shown for most species over the four years. This gives the manager a good idea on what kind of variation might be expected from year to year.

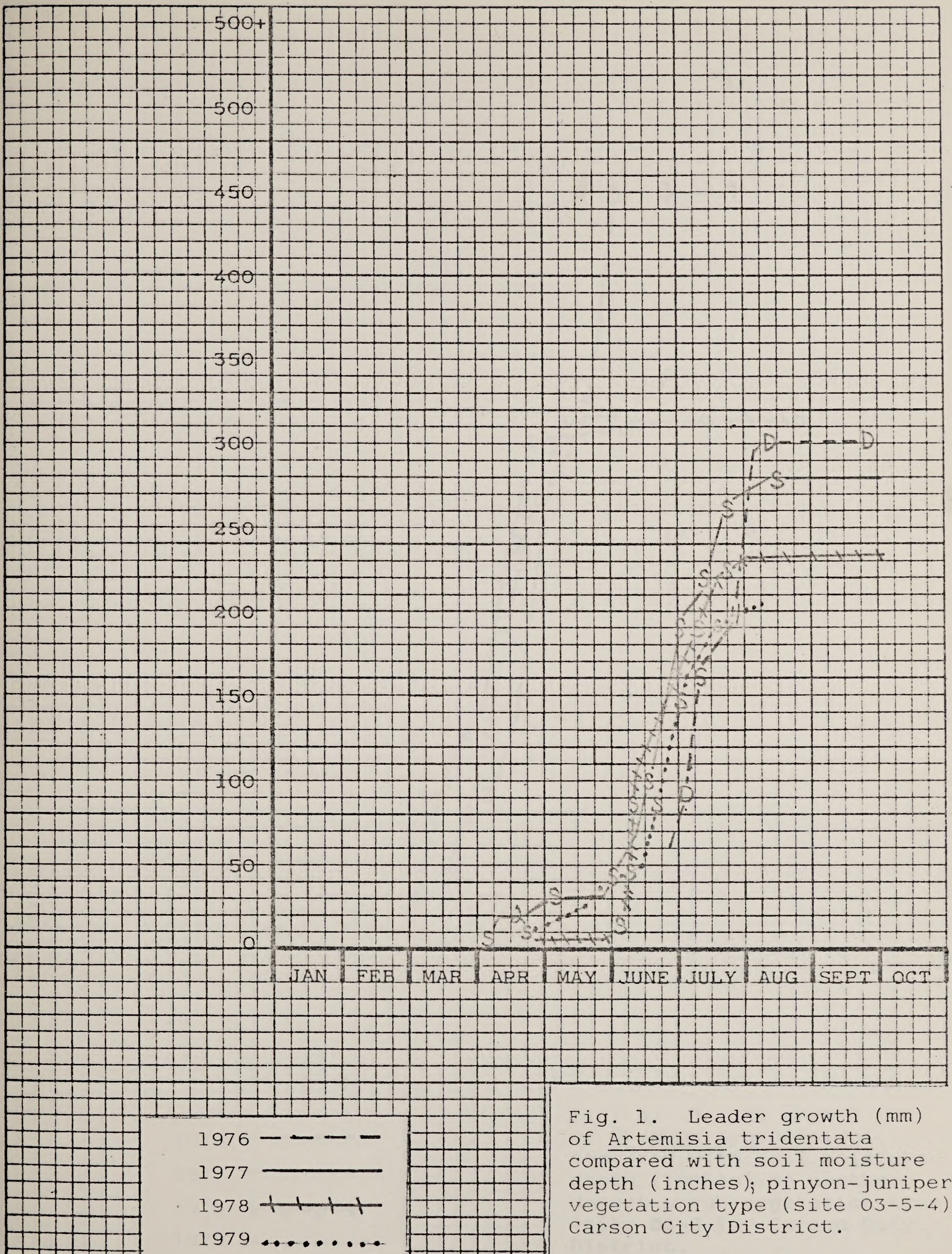


Fig. 1. Leader growth (mm) of Artemisia tridentata compared with soil moisture depth (inches); pinyon-juniper vegetation type (site 03-5-4), Carson City District.

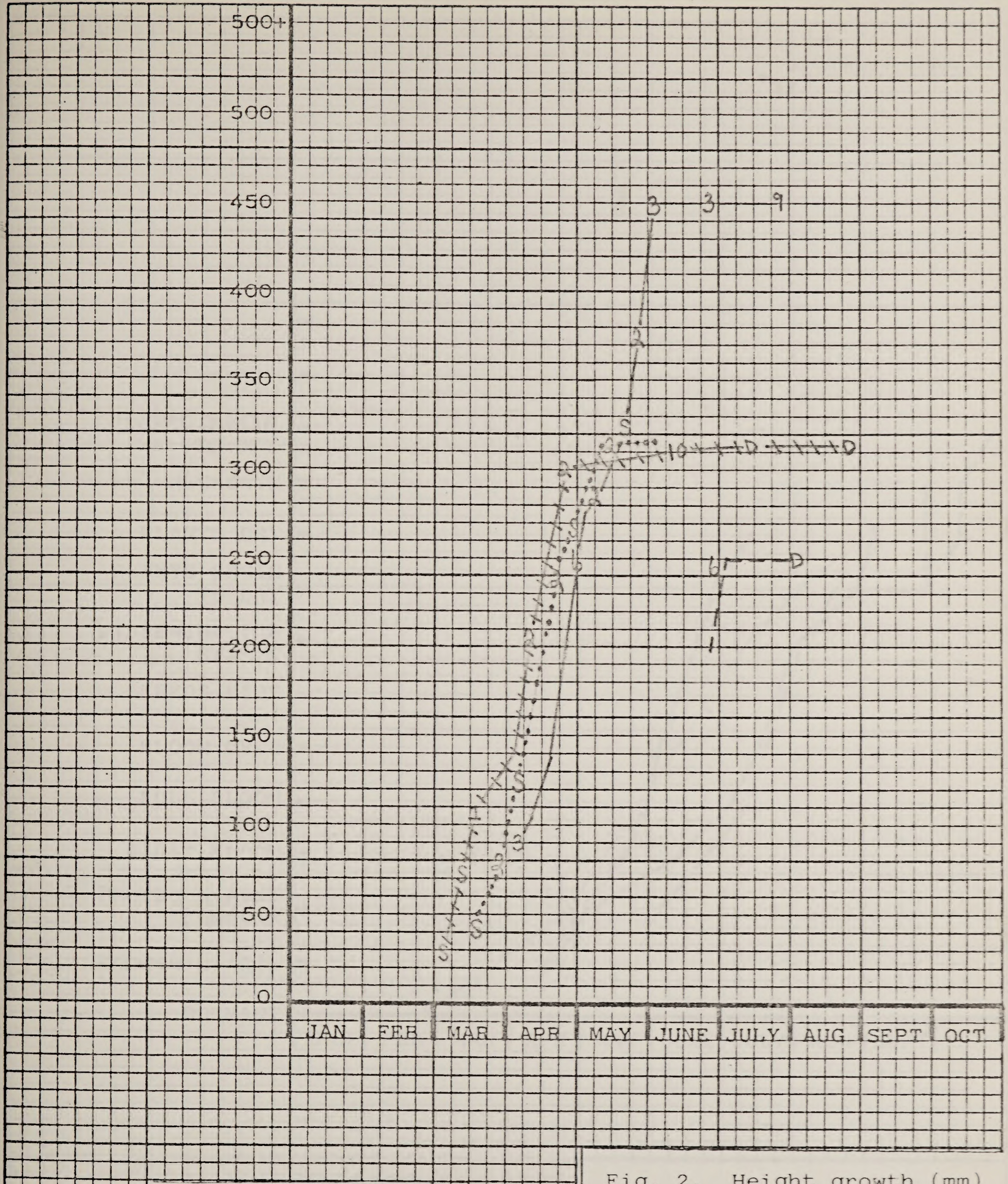


Fig. 2. Height growth (mm) of Oryzopsis hymenoides compared with soil moisture depth (inches) on northern desert shrub vegetation type (site 03-3-1), Carson City District.

BATTLE
CARROLL SUMMIT
CARSON CITY (NORTH)

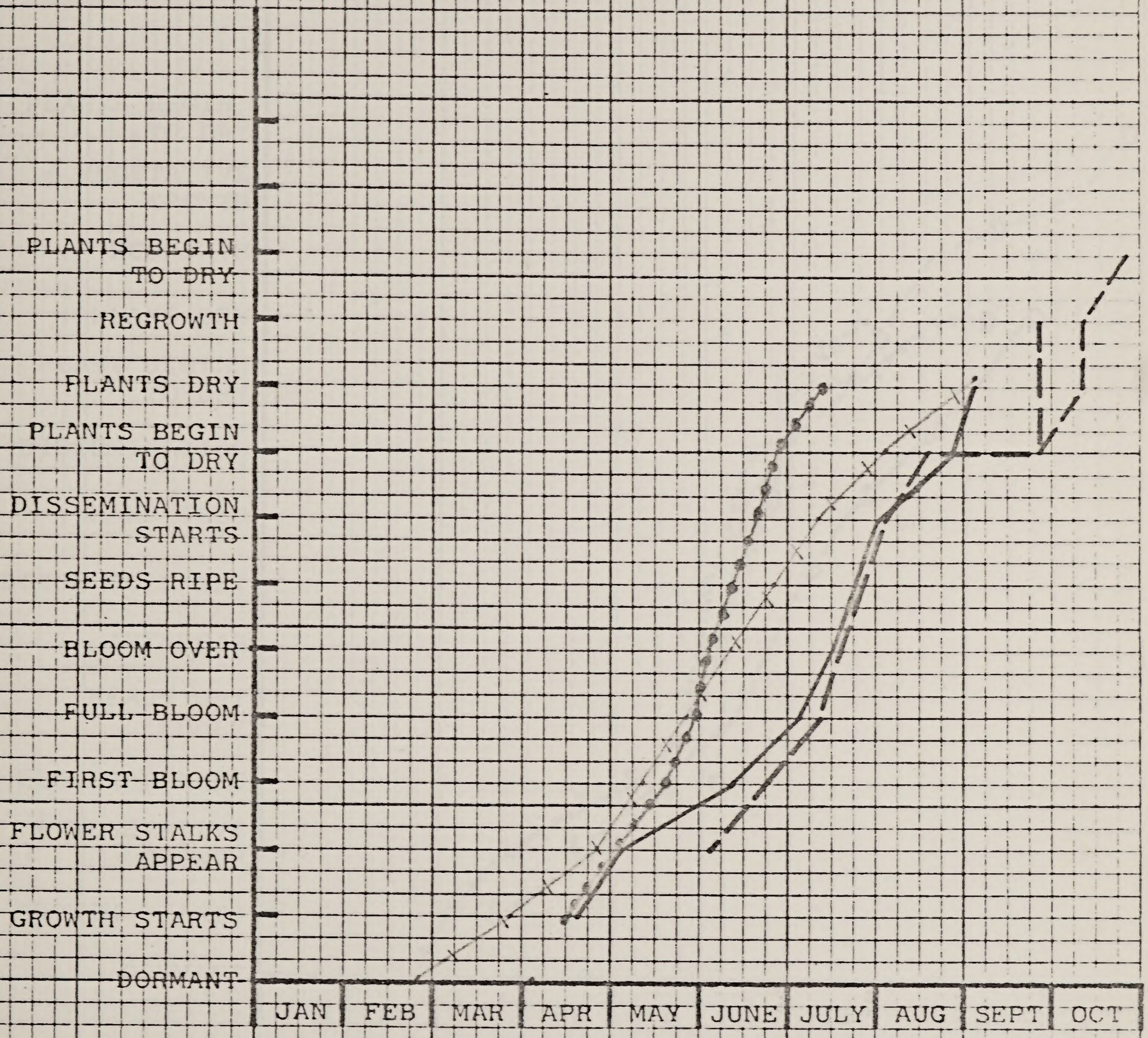


Fig. 3. Phenology of Sphaeralcea ambigua on salt desert shrub vegetation type (site 03-2-1), Carson City District.

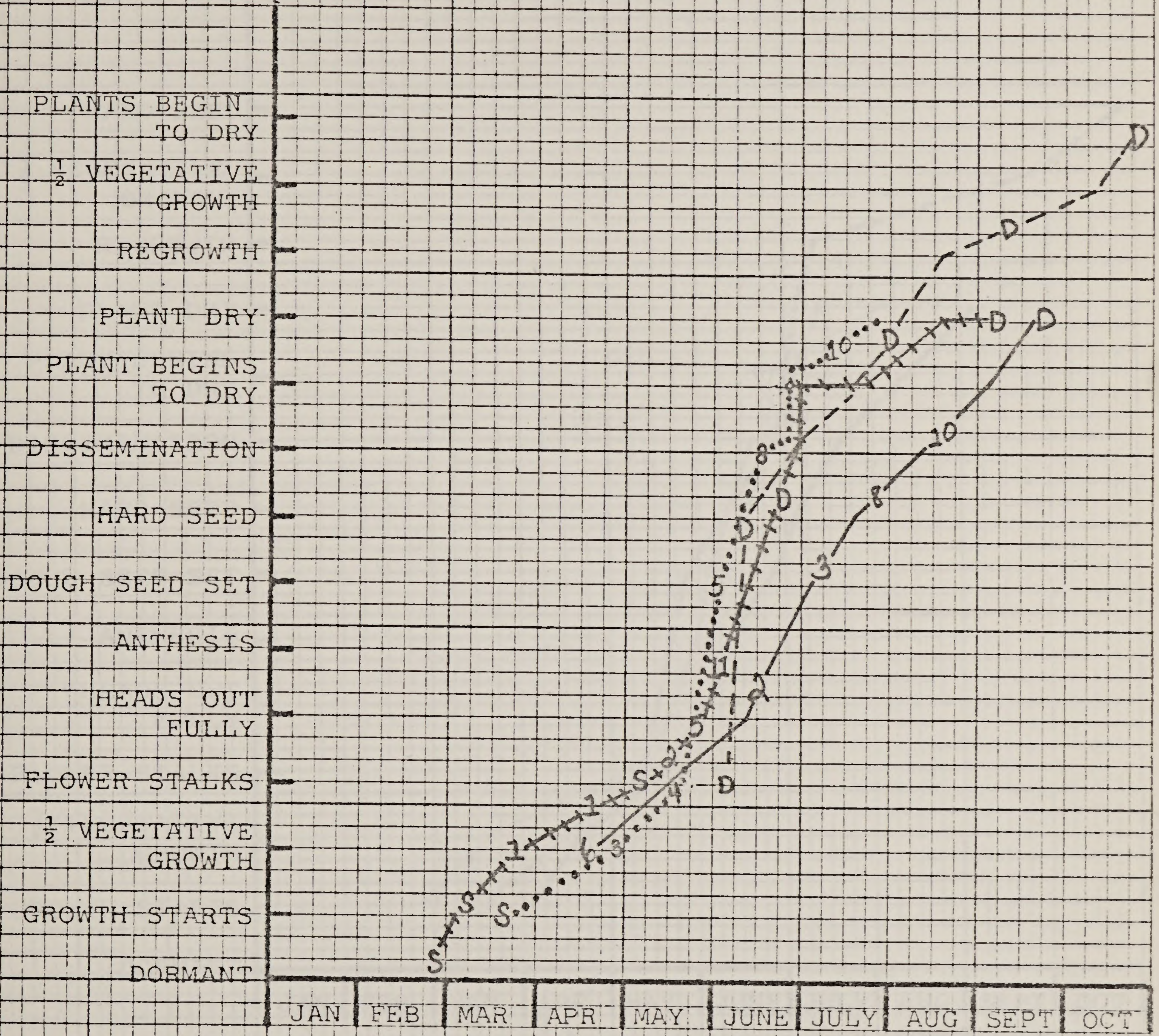


Fig. 4. Phenology of *Oryzopsis hymenoides* compared with soil moisture depth (inches) on salt desert shrub vegetation type (site 03-2-1), Carson City District.

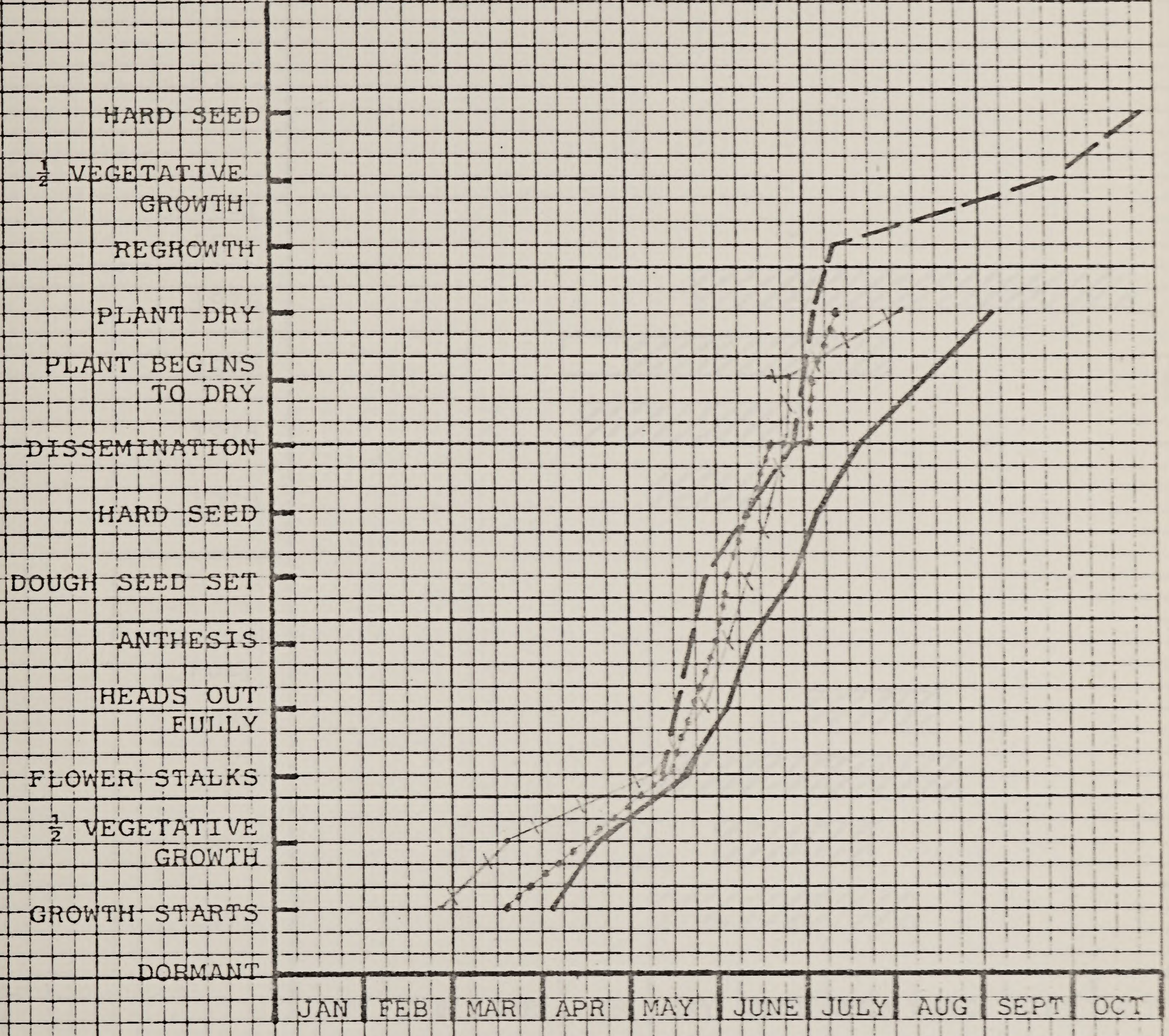


Fig. 5. Phenology of Sitanion hystrix on northern desert shrub vegetation type (site 03-3-1), Carson City District.

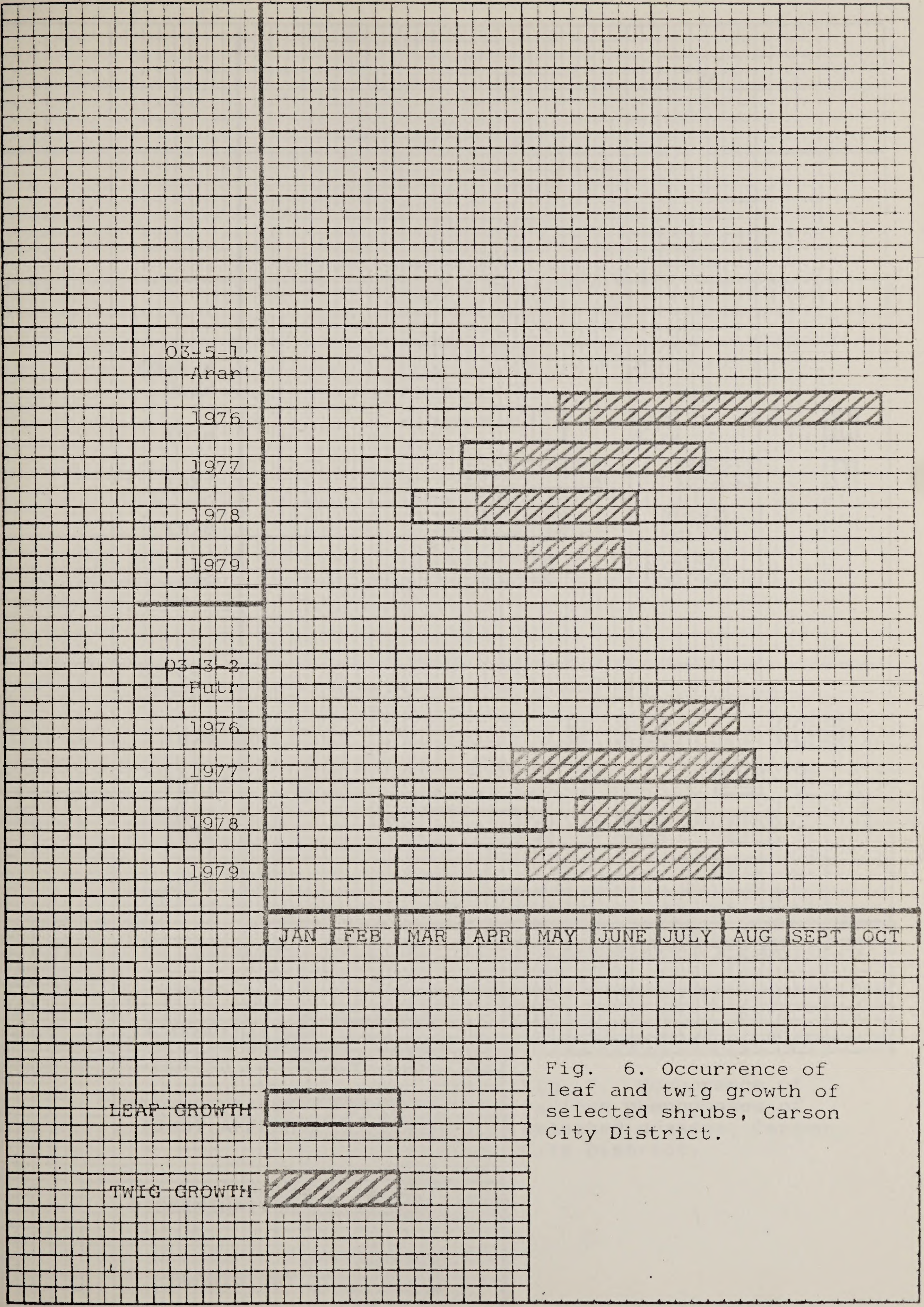


Fig. 6. Occurrence of leaf and twig growth of selected shrubs, Carson City District.

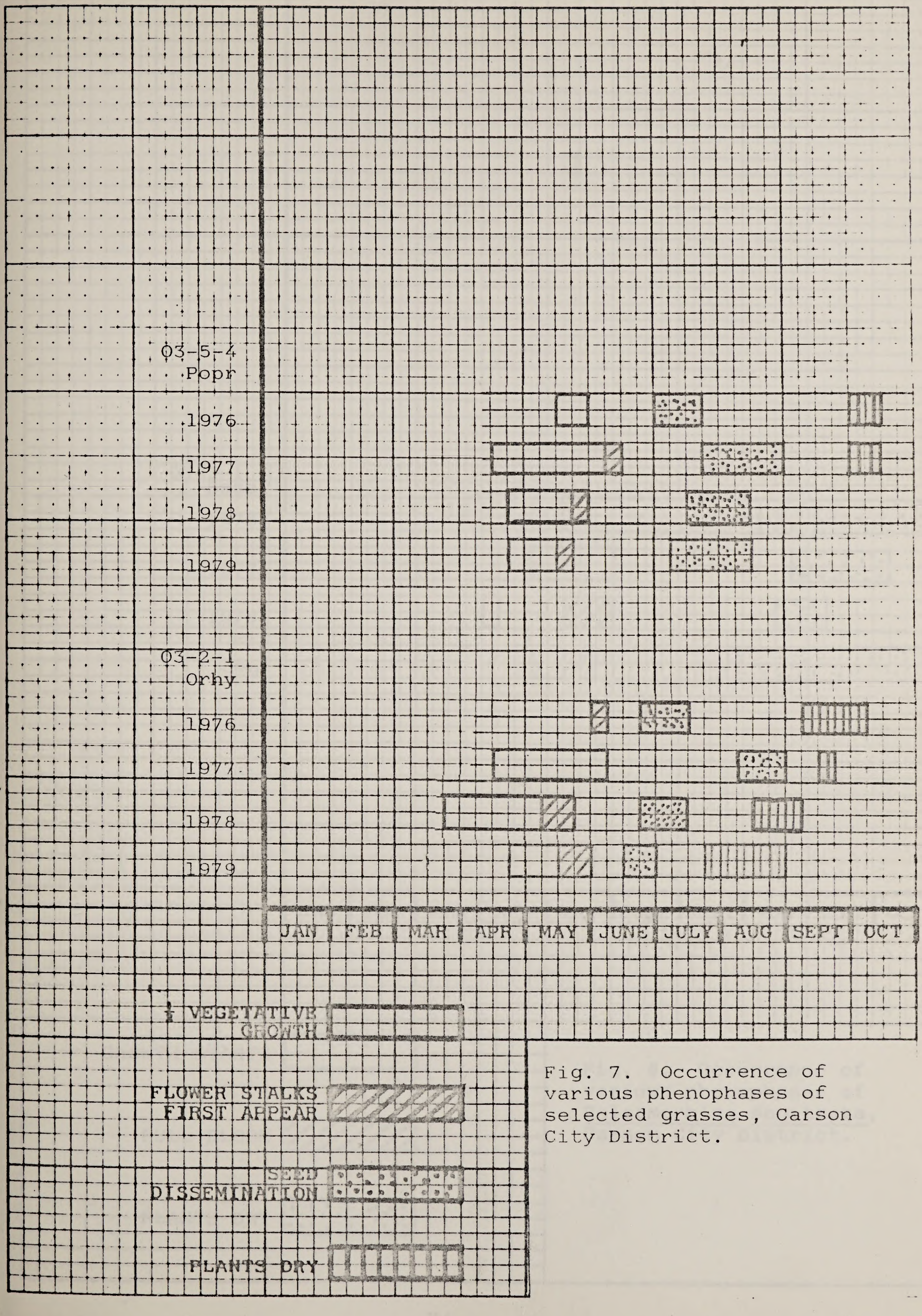


Fig. 7. Occurrence of various phenophases of selected grasses, Carson City District.

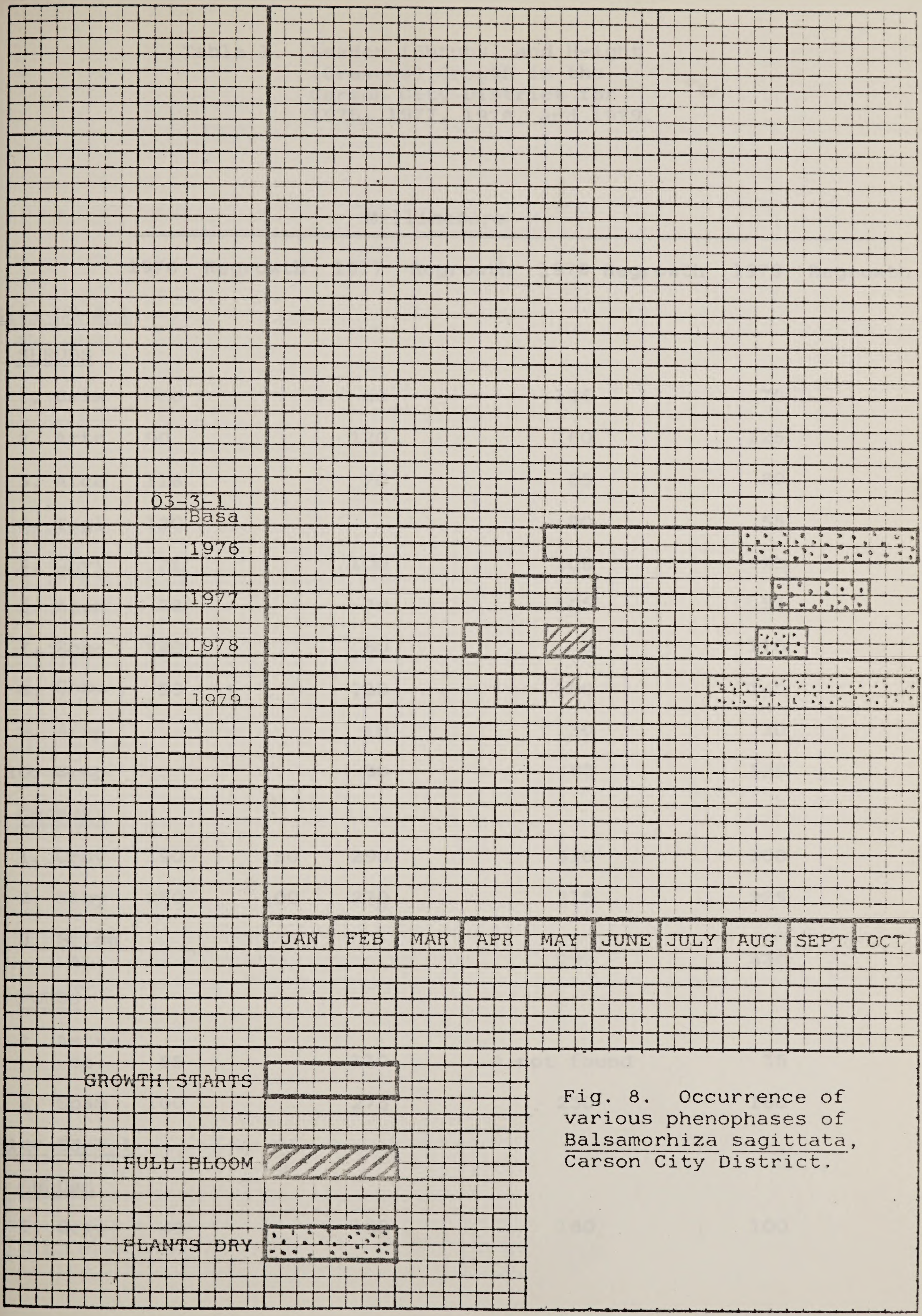


Fig. 8. Occurrence of various phenophases of Balsamorhiza sagittata, Carson City District.

Table 1. Leader (Shrubs) and Height (Grasses) Growth in the Carson City District for 1976, 1977, 1978, and 1979.

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 03-2-1 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Cela | 70 | | 80 | | 125 | | 70 | |
| 2. Artr | 90 | | 120 | | 160 | | 125 | |
| 3. Atca | 118 | | 70 | | 85 | | 80 | |
| 4. Tegl | 120 | | | | 90 | | 55 | |
| 5. Chvi | 71 | | 100 | | 105 | | 75 | |
| 6. Atco | 32 | | 70 | | 105 | | 55 | |
| 7. Epne | 240 | | 80 | | 0 | | 110 | |
| 8. Chna | 55 | | 120 | | 160 | | 140 | |
| 9. Arsp | | | 10 | | 30 | | 30 | |
| 10. Grsp | | | 30 | | 90 | | 125 | |
| GRASSES | | | | | | | | |
| 1. Orhy | 190 | 150 | 290 | | 310 | | 300 | |
| 2. Sihy | 250 | 100 | 270 | | 215 | | 225 | |
| 3. Stipa sp. | | | | | 290 | | 430 | |
| FORBS | | | | | | | | |
| 1. Astra sp. | 85 | | 110 | | not found | | 35 | |
| 2. Spam | 100 | | 275 | | 230 | | 160 | |
| Site 03-3-1 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Grsp | 40 | | 160 | | 180 | | 100 | |

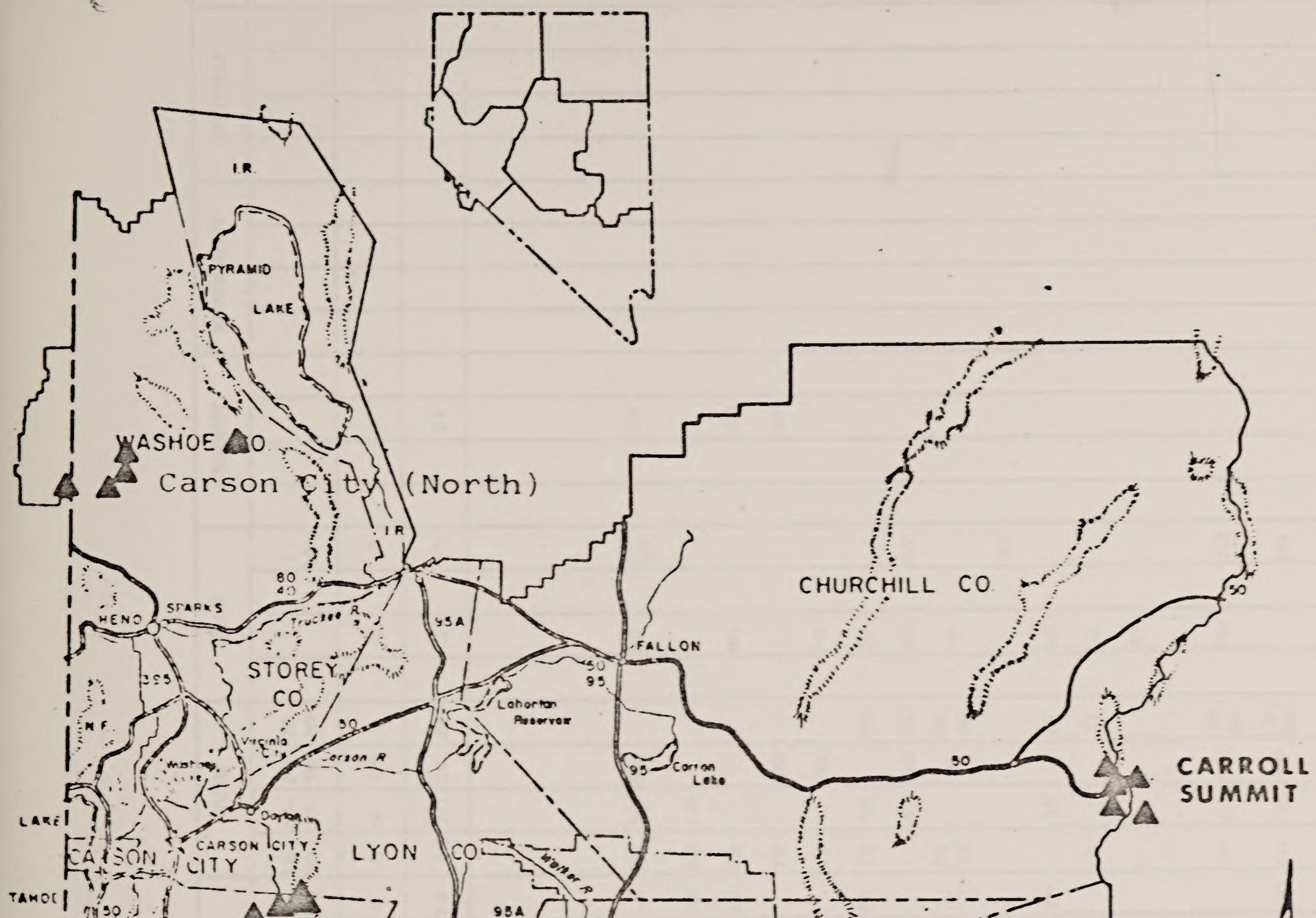
| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 03-3-1 Con't. | | | | | | | | |
| 2. Pran | 120 | | 50 | | 120 | | 30 | |
| 3. Artr | 80 | | 190 | | 210 | | 80 | |
| 4. Chvi | 50 | | 145 | | 145 | | 95 | |
| 5. Chna | 35 | | 140 | | 150 | | 130 | |
| 6. Epvi | 110 | | 75 | | 90 | | 35 | |
| 7. Lepu | 80 | | | | 180 | | 200 | |
| 8. Teca | | | 100 | | 140 | | 120 | |
| 9. Saca | | | 110 | | 70 | | 65 | |
| GRASSES | | | | | | | | |
| 1. Orhy | 250 | | 450 | | 310 | | 300 | |
| 2. Brte | 120 | | 140 | | 140 | | 120 | |
| 3. Sihy | 130 | | 250 | | 245 | | 220 | |
| 4. Stco | | | 180 | | 290 | | 260 | |
| FORBS | | | | | | | | |
| 1. Basa | 200 | | 250 | | 250 | | 310 | |
| Site 03-3-2 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 115 | | 160 | | 180 | | 80 | |
| 2. Epne | 100 | | 115 | | 100 | | 40 | |
| 3. Putr | 30 | | 120 | | 130 | | 40 | |
| 4. Pran | 35 | | 70 | | 90 | | 50 | |
| GRASSES | | | | | | | | |
| 1. Stth | | | | | 230 | | 200 | |
| 2. Sihy | 90 | | 195 | | 210 | | 180 | |

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 03-3-2 Con't. |  |  |  |  |  |  |  |  |
| 3. Orhy | 170 |  | 185 |  | 140 |  | 150 |  |
| 4. Stco |  |  | 140 |  | 140 |  | 180 |  |
| Site 03-5-1 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Arno-Arar | 15 |  | 105 |  | 140 |  | 30 |  |
| 2. Tegl | 75 |  |  |  | 55 |  | 35 |  |
| 3. Chna |  |  | 145 |  | 140 |  | 100 |  |
| 4. Grsp |  |  |  |  | 90 |  | 65 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Brte | 90 |  | 90 |  | 100 |  | 80 |  |
| 2. Sihy | 109 |  | 160 |  | 240 |  | 180 |  |
| 3. Stipa sp. |  |  | 100 |  | 175 |  | 180 |  |
| 4. Posa |  |  |  |  | 80 |  |  |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Erci |  |  | 100 |  | 150 |  | 30 |  |
| Site 03-5-2 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Artr | 220 |  | 220 |  | 280 |  | 200 |  |
| 2. Pran | 16 |  | 45 |  | 150 |  | 0 |  |
| 3. Putr | 25 |  | 70 |  | 170 |  | 50 |  |
| 4. Chna | 120 |  | 115 |  | 150 |  | 200 |  |
| 5. Ribes sp. | 100 |  |  |  | 50 |  | 0 |  |
| 6. Symph sp. | 70 |  | 100 |  | 90 |  | 110 |  |
| 7. Tegl |  |  | 100 |  | 140 |  | 150 |  |

| Millimeters | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
|---|---|---|---|---|---|---|---|---|
| 03-5-2 Con't. | | | | | | | | |
| GRASSES | | | | | | | | |
| 1. Elci | 850 | 335 | 680 | | 800 | | 150 | |
| 2. Posa | 32 | 70 | 160 | | 150 | | 155 | |
| 3. Sihy | 290 | 85 | 320 | | 270 | | 250 | |
| 4. Stth | | | | | 310 | | --- | |
| FORBS | | | | | | | | |
| 1. Senec sp. | | | 150 | | 180 | | 280 | |
| Site 03-5-4 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 300 | | 280 | | 230 | | 200 | |
| 2. Chna | 120 | | 170 | | 150 | | 140 | |
| 3. Ribes sp. | 15 | | 105 | | 80 | | 20 | |
| 4. Rowo | 130 | | 160 | | 65 | | 80 | |
| GRASSES | | | | | | | | |
| 1. Popr | 690 | | 495 | | 300 | | 360 | |
| 2. Juncu sp. | 610 | | 500 | | 550 | | 320 | |
| 3. Carex sp. | 370 | | 175 | | 160 | | 150 | |
| 4. Agrop sp. | | | 520 | | 670 | | 600 | |
| 5. Pobu | | | 250 | | 260 | | 160 | |
| 6. Agcr | | | 440 | | 600 | | 400 | |
| FORBS | | | | | | | | |
| 1. Poten sp. | | | | | 380 | | 300 | |
| 2. Taof | 205 | | 140 | | 120 | | 65 | |
| 3. Veth | 640 | | 1020 | | 750 | | 900 | |

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 03-5-4 Con't. |  |  |  |  |  |  |  |  |
| 4. Acmi |  |  | 380 |  | 550 |  | 340 |  |
| Site 03-7-1 |  |  |  |  |  |  |  |  |
| 1. Potr | 260 |  | 250 |  | 55 |  | 190 |  |
| 2. Ribes sp. | 100 |  | 125 |  | 60 |  | 60 |  |
| 3. Syal | 500 |  | 140 |  | 80 |  | 150 |  |
| 4. Artr | 300 |  | 220 |  | 170 |  | 220 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Posa | 70 | 100 | 185 |  | 130(grazed) |  | 180 |  |
| 2. Brte | 170 |  | 160 |  | grazed |  | 180 |  |
| 3. Brca |  |  | 375 |  | 200(grazed) |  | 400 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Alliu sp. |  |  | 180 |  | 175(grazed) |  | 220 |  |
| Site 03-7-3 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Artr | 290 |  | 340 |  | 300 |  | 200 |  |
| 2. Pran | 32 |  | 160 |  | 180 |  | 110 |  |
| 3. Ribes sp. | 14 |  | 170 |  | 90 |  | 60 |  |
| 4. Teca |  |  |  |  | 130 |  | 150 |  |
| 5. Putr | 75 |  | 135 |  | 140 |  | 110 |  |
| 6. Chna | 250 |  | 160 |  | 140 |  | 150 |  |
| 7. Epvi | 100 |  | 260 |  | 100 |  | 150 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Agcr | 485 | 165 | 500 |  | 450 |  | 500 |  |

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| 03-7-3 Con't. |  |  |  |  |  |  |  |  |
| 2. Sihy | 300 | 110 | 315 |  | 220 |  | 300 |  |
| 3. Orhy | 400 | 106 | 425 |  | 400 |  | 350 |  |
| 4. Agtr | 671 |  | 600 |  | 400 |  | 600 |  |
| 5. Brte | 265 | 80 | 210 |  | 100 |  | 140 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Circi sp. |  |  | 450 |  | 600 |  | 600 |  |
| 2. Lysp |  |  | 305 |  | 200 |  | 300 |  |



▲ SITE LOCATIONS
(Not all sites shown due
to closeness)

# CARSON CITY DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S+ | 2-15 | 3-30 | | 7-30 | 7-30 | 4-30 | 6-30 | 10-30 | 10-30 | 16-30 | 20-30 | 10-30 | 24-30 | | | | 1-18. | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | .15 | | 0 | 0 | .25 | .01 | 0 | 0 | 0 | 0 | .09 | 0 | | 0 | | .5 | | | 0 | | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | | | 9 | 9 | 12 | | 18 | 14 | 17 | 16 | 25 | 23 | 16 | 20 | 24 | 24 | | 24 | | 23 | | | 21 | | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-2-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cela | | | | | | | | | | | LG | | | | TG | | | | BV | 1B | FB | BO | SR | | | SD | | SD,<br>LY | | | LY | | | | | | | | | | | | | |
| Arsp | | | | | | | | | | | LG | | BV | | 1B | | FB | | BO | SR | SD | LD | | | | | | | | | | | | | | | | | | | | | | |
| Atca ♀ | | | | | | | | | | | LG | | | | | | | | TG | BV | FB | | | | | BO | | | | | SD | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | | LG | | | | | | | | BV | | FB | | BO | | | | | | | | SD | | | | | | | | | | | | | |
| Chvi | | | | | | | | | | | LG | | | | TG | | | | | | | | BV | | | FG | | | | | | | | | | | | | | | | | | |
| Atco | | | | | | | | | | | LG | | | | | | TG | | BV | FG | 1B | FB | | BO | | SD | | | | | | | | | | | | | | | | | | |
| Tegl | | | | | | | | | | | LG | | | | | | | TG | | | | BV | 1B | BO | | SD | | LY | | | | | | | | | | | | | | | | |
| Epne | | | | | | | | | | | D | | | | | | BV | | | 1B | FB,<br>TG | | BO | SR,<br>SD | | SD | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | | | BV | | | | | | | | | | | | | | | | |
| Grsp ♀ | | | | | | | | | | | LG | | | | BV | FG | FB | BO | | SR | | SD | | LY | | LD | | | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | | LG | | | | BV | FG | FB | | BO | | SD | | | LY | | LD | | | | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | | LG | | | | TG | | | | | | | | | BV | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | GS | | | | | ½V | | | FS | | DS | HS | SD | SD,<br>BD | | BD | | PD | | | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | ½V | | | | | | FS | HO | An | HS | SD | SD,<br>BD | | | | PD | | | | | | | | | | | | | | | | |

CARSON CITY
(NORTH)

CARROLL
SUMMIT

BATTLE
MOUNTAIN

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carson City Con't | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-2-1 Con't | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stipa sp. | | | | | | | | | | | GS | | | | | $\frac{1}{2}$V | | | FS | HO | An | HS | SD | SD, BD | | | | BD | | | PD | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spam | | | | | | | | | | | | | D | | GS | | | | 1B | FB | BO | SR | DS | BD | | PD | | | | | | | | | | | | | | | | | | |
| Astra sp. | | | | | | | | | | | | | D | | | | GS | | FS | 1B | BO | DS | PD | | | | | | | | | | | | | | | | | | | | | |

CARSON CITY
(NORTH)

CARROLL
SUMMIT

BATTLE
MOUNTAIN

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S+ | 3-15 | S-3 | | 4-30 | 7-30 | 2-30 | 5-30 | 5-30 | 12-30 | 18-30 | 18-30 | 18-30 | D | | | | 2+ | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | Sn | .02 | .48 | | 0 | 0 | .13 | .11 | .06 | 0 | 0 | 0 | 0 | 0 | | | | .74 | | | .07 | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | 6 | 9 | 11 | | 14 | 14 | 14 | 13 | 18 | 21 | 22 | 22 | 21 | 25 | | 25 | | 28 | | | 26 | | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-3-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chvi | | | | | | | | | | | LG | | | | | | TG | | | | | | | BV | | | | | | | | | | | | | | | | | | | | |
| Grsp ♀ | | | | | | | | | | | LG | | | | TG,<br>BV | | 1B | FB | BO | | SR | SD | | | | LY | | | | | LD | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | | LG | BV | | | TG | | 1B | FB | | BO | | SD | | | | LY | | | | | LD | | | | | | | | | | | | | |
| Epvi | | | | | | | | | | | D | | | | BV | | | | | 1B | FB,<br>TG | BO | SR | SD | | | | LY | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | BV | | | | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | LG | | | | | | | | TG | | | | | | BV | | | | | | | | | | | | | | | | | | |
| Teca | | | | | | | | | | | LG | | | | | | | | TG | | | | | BV | | | | 1B | | | SD | | | | | | | | | | | | | |
| Pran | | | | | | | | | | | D | | | | BV | | 1B | FB | | TG,<br>BO | SR | SD | | | | | | LY | | | | | | | | | | | | | | | | |
| Lepu | | | | | | | | | | | LG | | | | | | | TG | | 1B | FB | | BO | | | | | SD | | | LY | | | | | | | | | | | | | |
| Saca | | | | | | | | | | | LG | | | | | | TG | | | BV | FB | | | BO | | | | SR,<br>SD | | | LY | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | | | $\frac{1}{2}$V | | | FS | | HO,<br>An | DS | HS | SD | SD,<br>BD | | PD | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | GS | | | | $\frac{1}{2}$V | | | | FS | HO | DS | HS | | SD | | SD,<br>BD | | | | | BD | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | GS | | | | | | $\frac{1}{2}$V | FS | HO | An | DS | SD | BD | PD | | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | | | | | |
| Precip. (mm) | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | | | | | | |
| Carson City | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-3-1 Con't | | | | | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | |
| Stco | | | | | | | | | | | GS | | | | | ½V | | FS | | HO | DS | HS | SD | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | |
| Basa | | | | | | | | | | | D | | | | GS | | | 1B | FB | SR | DS | | BD | |

| SYMBOL 1979 | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | |
| Precip. (mm) | | | | | | | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | | |
| Carson City | | | | | | | | | | | | | | | | | | | | |
| 03-3-1 Con't | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | |
| Stco | | SD<br>BD | | BD | | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | |
| Basa | | | | PD | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S+ | 2-15 | 1-30 | | 6-30 | 4-30 | 6-30 | 1-30 | 8-30 | 11-30 | 20 30 | 21 30 | 3-30 | 17-30 | | | | 1-16. | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | .05 | .20 | | 0 | 0 | .26 | .07 | .01 | 0 | 0 | 0 | .47 | 0 | | 0 | | .60 | | | 0 | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | 5 | 10 | 7 | | 15 | 13.5 | 15 | 14 | 22 | 22 | 25 | 24 | 20 | 20 | | 21 | | 25 | | | 23 | | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-3-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | | | BV | | | | | | | | | | | | | | | | |
| Epne | | | | | | | | | | | D | | | | | | | | | BV | | 1B | FB | SR | | SD | | LY | | | | | | | | | | | | | | | | |
| Pran | | | | | | | | | | | D | | | | BV | | FB | | BO | SR | TG | | | SD | | | | LY | | | | | | | | | | | | | | | | |
| Putr | | | | | | | | | | | LG | | | | | | TG | BV | FB | BO | TG,<br>SR | | | SD | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | GS | | | | | ½V | | | | FS | HO | An | DS | HS | | SD | | | | | BD | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | | | | ½V | | FS | | HO | An | DS | HS | SD | | SD,<br>BD | | BD | | | PD | | | | | | | | | | | | | |
| Stth | | | | | | | | | | | GS | | | | ½V | | | | | FS | | HO | HS | SD | | SD,<br>BD | | PD | | | | | | | | | | | | | | | | |
| Stco | | | | | | | | | | | GS | | | | | ½V | | | FS | HO | An | DS | HS | SD | | SD,<br>BD | | | | | BD | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | D | | | | | ½V | | FS | HO | An | DS | HS | SD | BD | | PD | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S+ | 3-30 | 1-0 | | 7-30 | 8-30 | 4-30 | S-30 | 10-30 | 13-30 | 17-30 | 18-30 | S-3. | D | | | | 2-30 | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | .51 | | 0 | .13 | .20 | .12 | .04 | 0 | 0 | 0 | .02 | 0 | | 0 | | .38 | | | .1 | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | 6 | 7 | 11 | | 13 | 11 | 14 | 12 | 19 | 21 | 24 | 22 | 20 | 24 | | 24 | | 26 | | | 24 | | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-5-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arno | | | | | | | | | | | LG | | | | | | TG | | | | | | | | | | | | | | BV | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | | LG | | | | | | | TG | | | | | | | | BV | | | | | | | | | | | | | | | | |
| Tegl | | | | | | | | | | | LG | | | | | | | | | TG | | BV | 1B | BO | | SD | | LD | | | | | | | | | | | | | | | | |
| Grsp ♀ | | | | | | | | | | | LG | | | | | BV | FG | 1B | | FB | BO | SD | | | | LY | | LD | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | | LG | | | | BV | | 1B | FB | | BO | | SD | | | | LY | | LD | | | | | | | | | | | | | | | | |
| Chvi | | | | | | | | | | | LG | | | | | TG | | | | | | BV | FG | | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | ½V | | | | | | FS | HO | DS | HS | SD | SD, BD | | BD | | PD | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | GS | | | | | | ½V | FS | HO | An, DS | HS | SD | PD | | | | | | | | | | | | | | | | | | | | | |
| Stipa sp. | | | | | | | | | | | GS | | | | ½V | | | | FS | HO | An | DS | HS | SD | | BD | | | | | PD | | | | | | | | | | | | | |
| Posa | | | | | | | | | | | GS | | | | FS | HO | | | An, DS | SD | BD | PD | | | | | | | | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Erci | | | | | | | | | | | GS | | | | | | FB | BO | SR | DS, BD | PD | | | | | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S+ | S+ | Sn | | S+ | S+ | S+ | S+ | 1-30 | 6-30 | 12-30 | 13-30 | 2-30 | 23-30 | | | | S+ | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | Sn | .7 | .71 | | 0 | 6.7 | .51 | .25 | .17 | .10 | 0 | 0 | .26 | 0 | | 0 | | 1.02 | | | .8 | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | 1 | 3 | 3 | | 6 | 5 | 6 | 5.5 | 10 | 13 | 15 | 15 | 12 | 18 | | 18 | | 19 | | | 19 | | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-5-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Putr | | | | | | | | | | | LG | | | | | | | | | BV | 1B | FB | BO | | | | | SR | | | SD | | | | | | | | | | | | | |
| Symph sp. | | | | | | | | | | | D | | | | | | | LG | TG | FG | 1B | FB | | BO | | | | SR | | | SD | | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | | | D | LG | | | | BV | | FG | 1B | BO | | SR | | | | | | | | | SD | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | BV | | | | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | LG | | | | | | | | TG | | | | | | BV | | | | | | | | | | | | | | | | | | |
| Tegl | | | | | | | | | | | D | | | | LG | | | | | | TG | | | | | | | | | | FB | | | | | | | | | | | | | |
| Pran | | | | | | | | | | | D | | | | | | | TG | BV | 1B | FB | BO | SR | SD | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Elci | | | | | | | | | | | D | | | | | | GS | | | ½V | | | | FS | | An | | DS | | | SD | | | | | | | | | | | | | |
| Posa | | | | | | | | | | | GS | | | | | | ½V | | | FS | HO | An | DS | HS | | PD | | | | | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | | | | | ½V | | | | FS | | An | | | SD | | BD | | | PD | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Senec sp. | | | | | | | | | | | D | | | | GS | | | | FS | 1B | FB | BO | DS | | | BD | | PD | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | W | E | T | | M | E | A | D | O | W | | | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | Sn | .45 | .31 | | 0 | .86 | .36 | .13 | .21 | .02 | 0 | 0 | .53 | 0 | | 0 | | .5 | | | .5 | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | 3 | 6 | 7 | | 9 | 9 | 11 | 11 | 12 | 14 | 15 | 14 | 13 | 22 | | 19 | | 20 | | | 18 | | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-5-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rowo | | | | | | | | | | | D | | | | | | LG | | | TG | | | | BV | | BO | | SD | | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | | | | LG | | | | | | TG | | | | | | | BV | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | | | BV | | | | | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | | | D | | LG | | | | BV | 1B | FB | BO | SR | | TG | | | | | | | | SD | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Popr | | | | | | | | | | | GS | | | | | ½V | | | FS | HO | | An | DS | HS | | HS,<br>SD | | SD | | | BD | | | | | | | | | | | | | |
| Agrop sp. | | | | | | | | | | | GS | | | | | | ½V | | | FS | HO | | DS | | | | | HS | | | | | | | | | | | | | | | | |
| Pobu | | | | | | | | | | | GS | | | | | | ½V | FS | HO | An | DS | HS | SD | BD | | | | PD | | | | | | | | | | | | | | | | |
| Juncu sp. | | | | | | | | | | | D | | | | GS | | ½V | | | FS | HO | | An | DS | | | | HS | | | SD | | | | | | | | | | | | | |
| Agcr | | | | | | | | | | | GS | | | | | | ½V | | | | FS | HO | DS | | | | | | | | HS | | | | | | | | | | | | | |
| Carex sp. | | | | | | | | | | | D | | | | | GS | ½V | | | FS | HO | An | | HS | | | | SD | | | BD | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Veth | | | | | | | | | | | D | GS | | | | | | | | | | | | | | FS | | 1B | | | FB | | | | | | | | | | | | | |
| Poten sp. | | | | | | | | | | | D | GS | | | | | | | | | FS | 1B | FB | BO | | | | | | | DS | | | | | | | | | | | | | |
| Acmi | | | | | | | | | | | D | GS | | | | | | | | | FS | 1B | FB | | | | | | | | | | | | | | | | | | | | | |
| Taof | | | | | | | | | | | D | | GS | | FB | | | BO | SR | DS | | | | | | | | BD | | | PD | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | --- | --- | S | N | O | W | --- | --- | Sn | Sn | S+ | 1-30 | 2-30 | 4-30 | S-30 | 9-30 | | | | S-.30 | | | | | | | | | | | | | | | |
| Precip. (in ) | | | | | | | | | | | | | | | | | Sn | .37 | .20 | .09 | 0 | 0 | .51 | | | 0 | | 1.04 | | | .45 | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | | | | | | | | | 3 | 5 | 7 | 8 | 10 | 11 | 9 | 20 | | 20 | | 15 | | | 16 | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-7-01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | | | | | | | | | LG | | BV | FG | 1B | FB,<br>TG | BO | SR | | | | | | | SD | | | | | | | | | | | | |
| Artr | | | | | | | | | | | | | | | | | LG | | | TG | | | | | | BV | | | | | | | | | | | | | | | | | |
| Potr | | | | | | | | | | | | | | | | | D | | LG | TG | | | | | | FG | | | | | | | | | | | | | | | | | |
| Syal | | | | | | | | | | | | | | | | | D | | LG | TG | | | BV | | | BO | | | | | SD | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | | | | | | | D | | | GS | FS | HO | An | DS | | | | | | | BD,<br>GS | | | | | | | | | | | | |
| Posa | | | | | | | | | | | | | | | | | GS | | ½V | FS,<br>HO | An | DS | | | | | | SD | | | | | | | | | | | | | | | |
| Brca | | | | | | | | | | | | | | | | | GS | | | ½V,<br>FS | HO | An | DS | | | | | | | | SD | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alliu sp. | | | | | | | | | | | | | | | | | GS | | FS | 1B | | FB | | | | BO | | SR | | | PD | | | | | | | | | | | | |

CARSON CITY
(NORTH)

CARROLL
SUMMIT

BATTLE

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S+ | S-15 | S+ | | 1-30 | 1-30 | S+ | S+ | 5-30 | 6-30 | 14-30 | 14-30 | 1-30 | 12-30 | | | | 1-18. | | | | 1-30 | | | | | | | | | | | | |
| Precip. (in.) | | | | | | | | | | | Sn | .35 | .31 | | 0 | .74 | .45 | .17 | .13 | .02 | 0 | 0 | .27 | 0 | | 0 | | .5 | | | | .4 | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | 2 | 5 | 5 | | 9 | 8 | 9 | 10 | 15 | 18 | 21 | 20 | 17 | 23 | | 23 | | 21 | | | | 19 | | | | | | | | | | | | |
| CARSON CITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03-7-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | BV | | | | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | | | | LG | | | | | TG | | | | | | BV | | | | | | | | | | | | | | | | | | |
| Epvi | | | | | | | | | | | D | | | | | | | | BV | | 1B, TG | FB | BO | SR | | SD | | | | | | | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | | | D | LG | | | BV | | 1B | FB | | BO | SR | TG | | | | | | SD | | | | | | | | | | | | | | | | |
| Pran | | | | | | | | | | | D | LG | | | | | | BV | 1B | FB | BO | SR | | | | | | SD | | | | | | | | | | | | | | | | |
| Teca | | | | | | | | | | | D | LG | | | | | | | TG | | | | BV | | | FG | | 1B | | | | SD | | | | | | | | | | | | |
| Putr | | | | | | | | | | | LG | | | | | | | | BV | FB | BO | SR | | | | | | SD | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agcr | | | | | | | | | | | GS | | | | ½V | | | | FS, HO | | | | An | DS | | | | | | | | HS | | | | | | | | | | | | |
| Brte | | | | | | | | | | | D | GS | | | | | ½V | FS | HO | An | DS | HS | BD | PD | | | | | | | | | | | | | | | | | | | | |
| Agtr | | | | | | | | | | | GS | | | | | | ½V | | | FS | | | | HO | | DS | | | | | | HS | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | GS | | | | | | ½V | | | FS | HO | An | DS | | | HS, SD | | SD | | | | BD | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | ½V | | | | | | | FS | HO | An | DS | | | HS, SD | | BD | | | | PD | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cirsi sp. | | | | | | | | | | | D | | | | | | | | | GS | | | FS | 1B, FB | | | | | | | | SR, DS | | | | | | | | | | | | |
| Lysp | | | | | | | | | | | D | | GS | | | | | | | | | | BO | | | | | SR | | | | DS | | | | | | | | | | | | |

BATTLE

CARROLL
SUMMIT

CARSON CITY
(NORTH)

## CARSON CITY (NORTH OF RENO)

This data set is most notable for the similarity among the three years 1977, 1978, and 1979. No data was obtained in 1976. The data for bitterbrush (*Purshia tridentata*; Figure 1), Indian ricegrass (*Oryzopsis hymenoides*; Figure 2), and Needle-and-thread (*Stipa comata*; Figure 3) show curves that are very similar. Leader growth data for bitterbrush shows that 1979 was intermediate in growth rate when compared with 1978, a good growth year, and 1977, a poor growth year (Figure 5). Height growth of Indian ricegrass was very similar in 1978, but 1977 was a year where growth came later and exceeded both 1978 and 1979 (Figure 6).

Seed dissemination occurred about one week later for squirreltail grass (*Sitanion hystrix*) in 1978 when compared with 1977 and 1979 (Figure 7) and several weeks earlier in 1979 for lupine (*Lupinus caudatus*; Figure 9). Twig growth of bitterbrush was much later in 1977 than either 1978 or 1979 (Figure 8). Shrub leader growth was somewhat less in 1979, when compared with 1977 and 1978 (Table 1), indicating a poorer growth year. For grasses, the culm height growth was comparable in each year.

On a couple of sites, winterfat (*Ceratoides lanata*) and peachbrush (*Prunus andersonii*) did not develop twig growth; rabbitbrush (*Chrysothamnus nauseosus*) developed almost no seed heads in 1979.

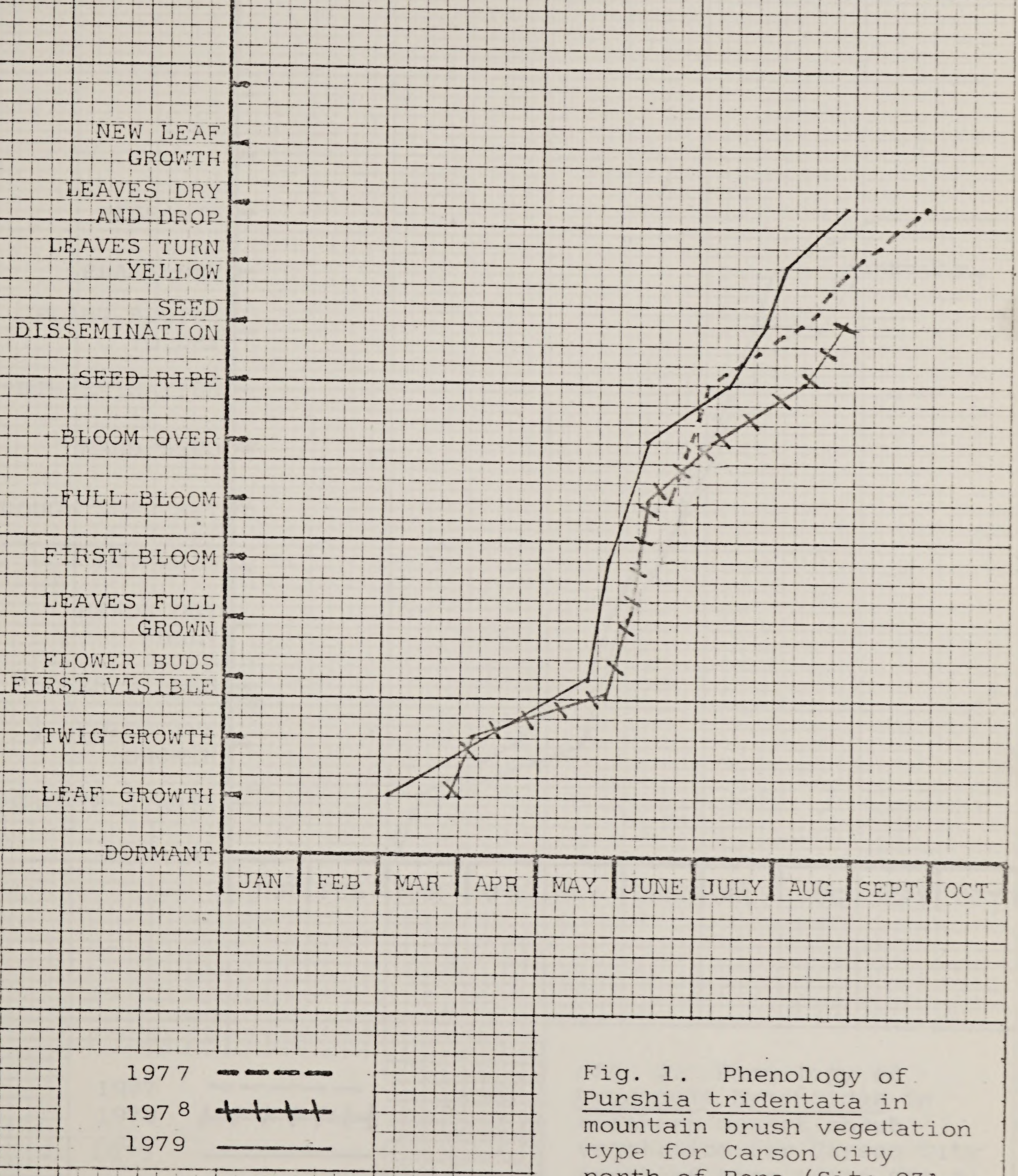


Fig. 1. Phenology of Purshia tridentata in mountain brush vegetation type for Carson City north of Reno (Site 03A-7-2) for 1977, 1978, and 1979.

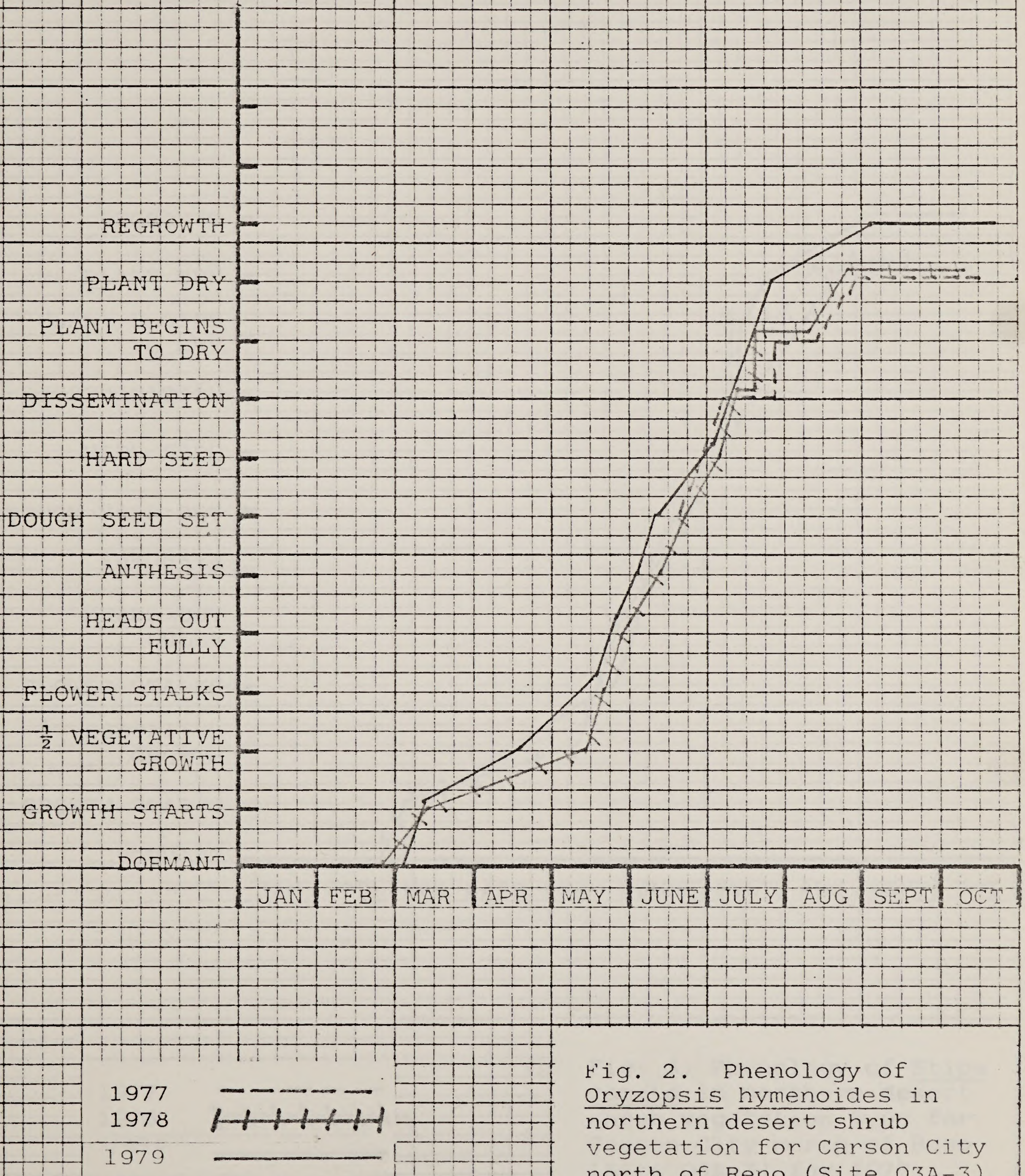


Fig. 2. Phenology of Oryzopsis hymenoides in northern desert shrub vegetation for Carson City north of Reno (Site 03A-3) for 1977, 1978, and 1979.

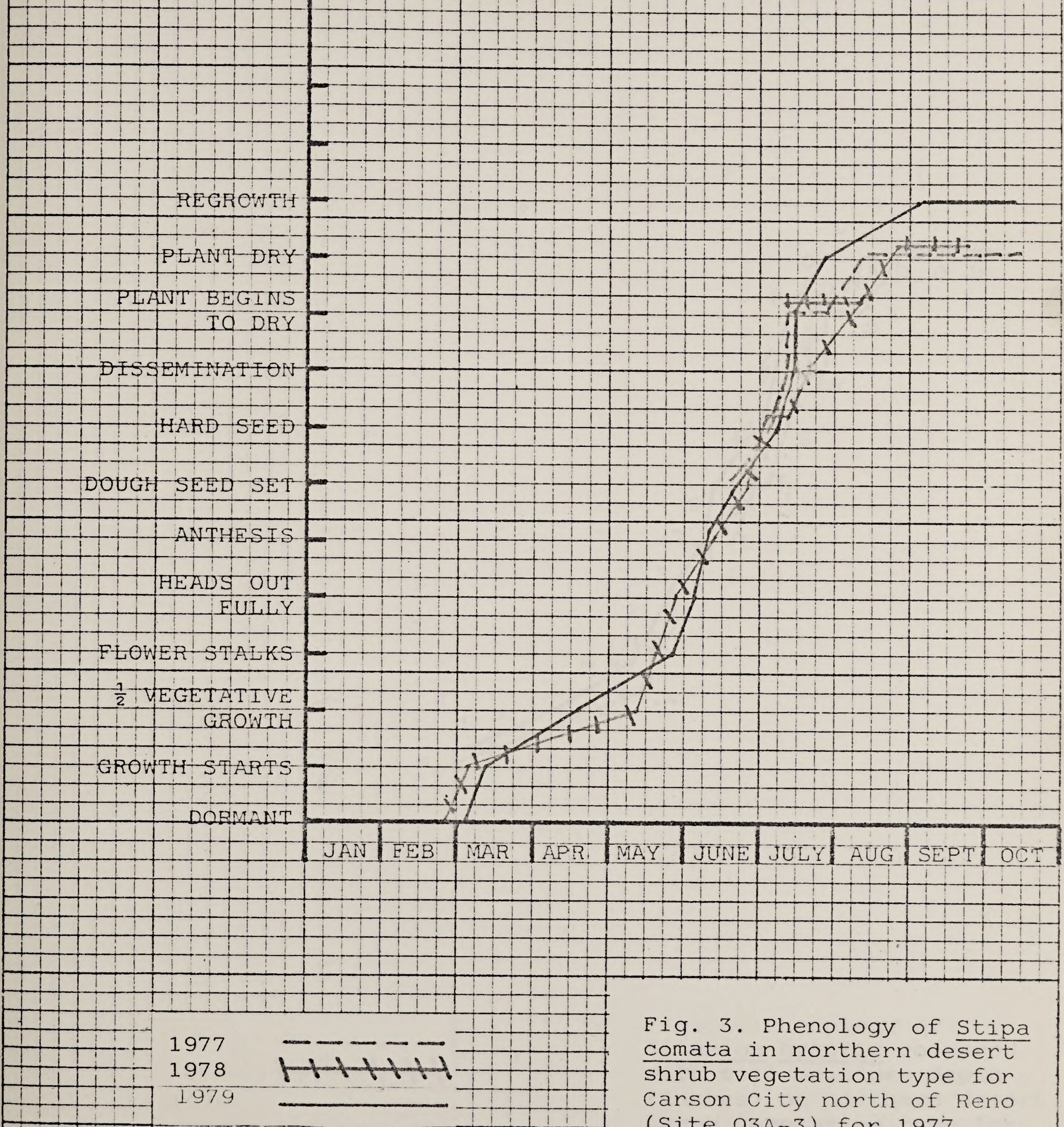


Fig. 3. Phenology of *Stipa comata* in northern desert shrub vegetation type for Carson City north of Reno (Site 03A-3) for 1977, 1978, and 1979.

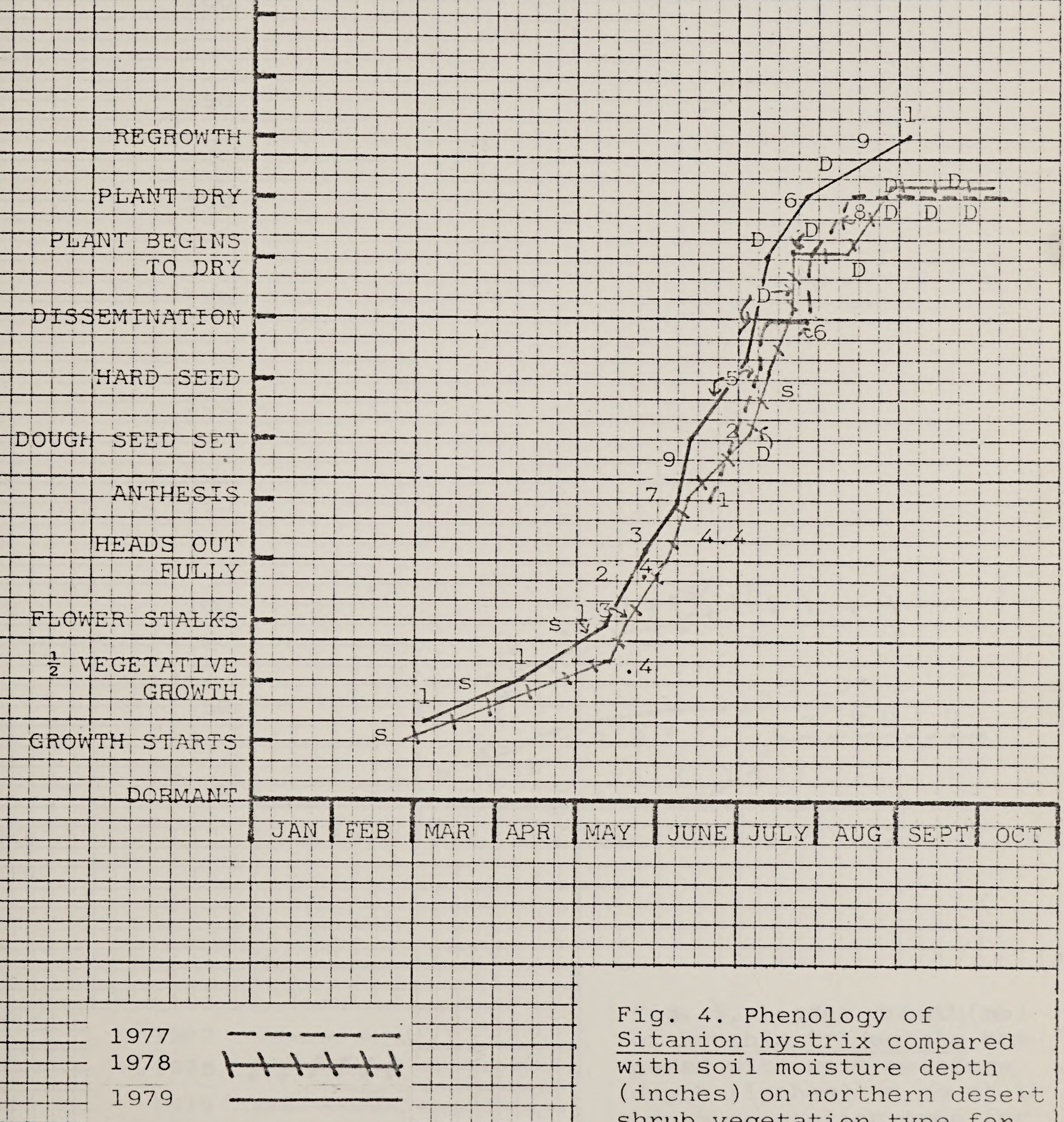


Fig. 4. Phenology of Sitanion hystrix compared with soil moisture depth (inches) on northern desert shrub vegetation type for Carson City north of Reno (Site 03A-3) for 1977, 1978, and 1979.

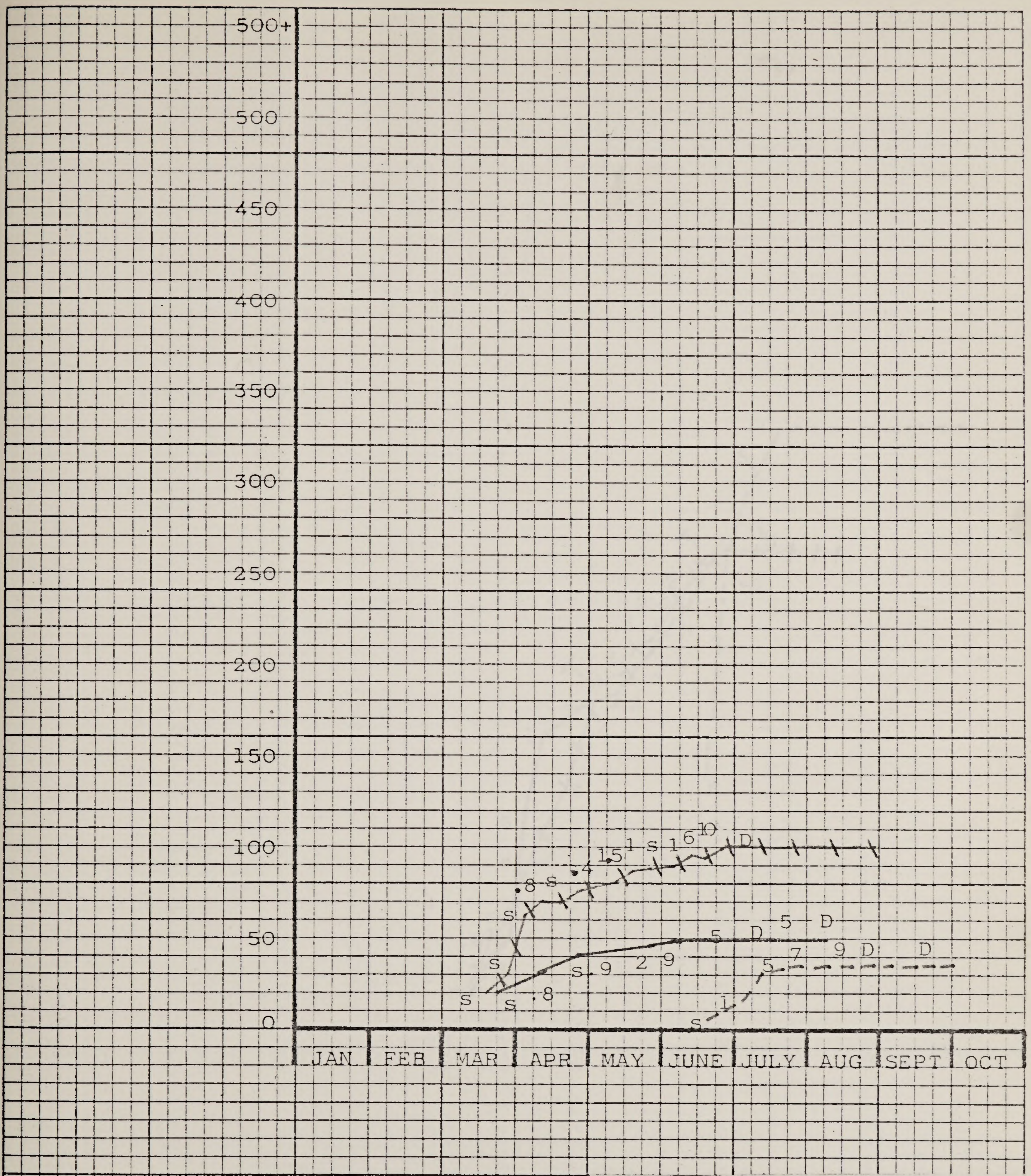


Fig. 5. Leader growth(mm) of Purshia tridentata compared with soil moisture depth (inches) on mountain brush vegetation type for Carson City north of Reno (Site 03A-7-1) for 1977, 1978 and 1979.

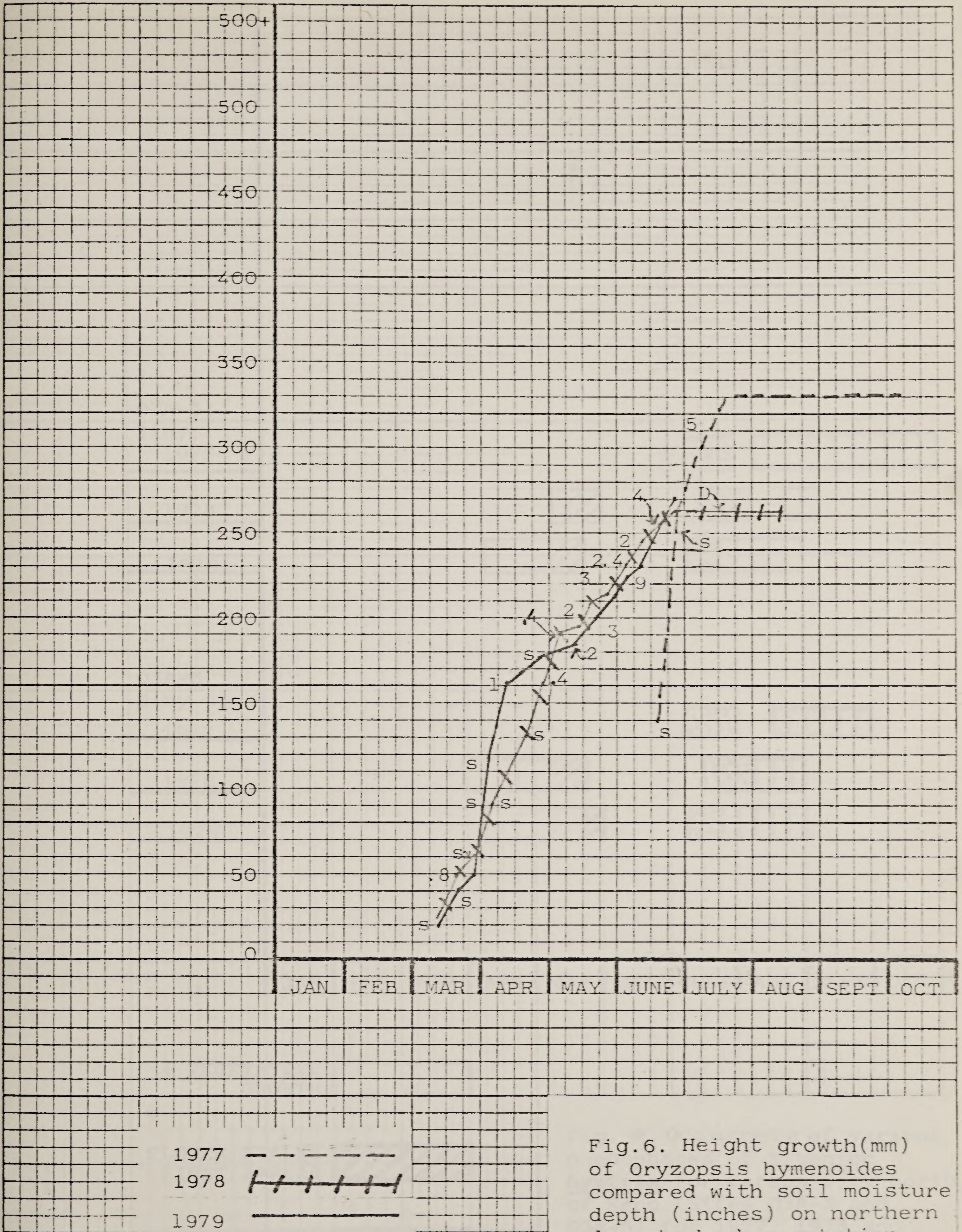


Fig.6. Height growth(mm) of Oryzopsis hymenoides compared with soil moisture depth (inches) on northern desert shrub vegetation type for Carson City north of Reno (Site 03A-3) for 1977, 1978, and 1979.

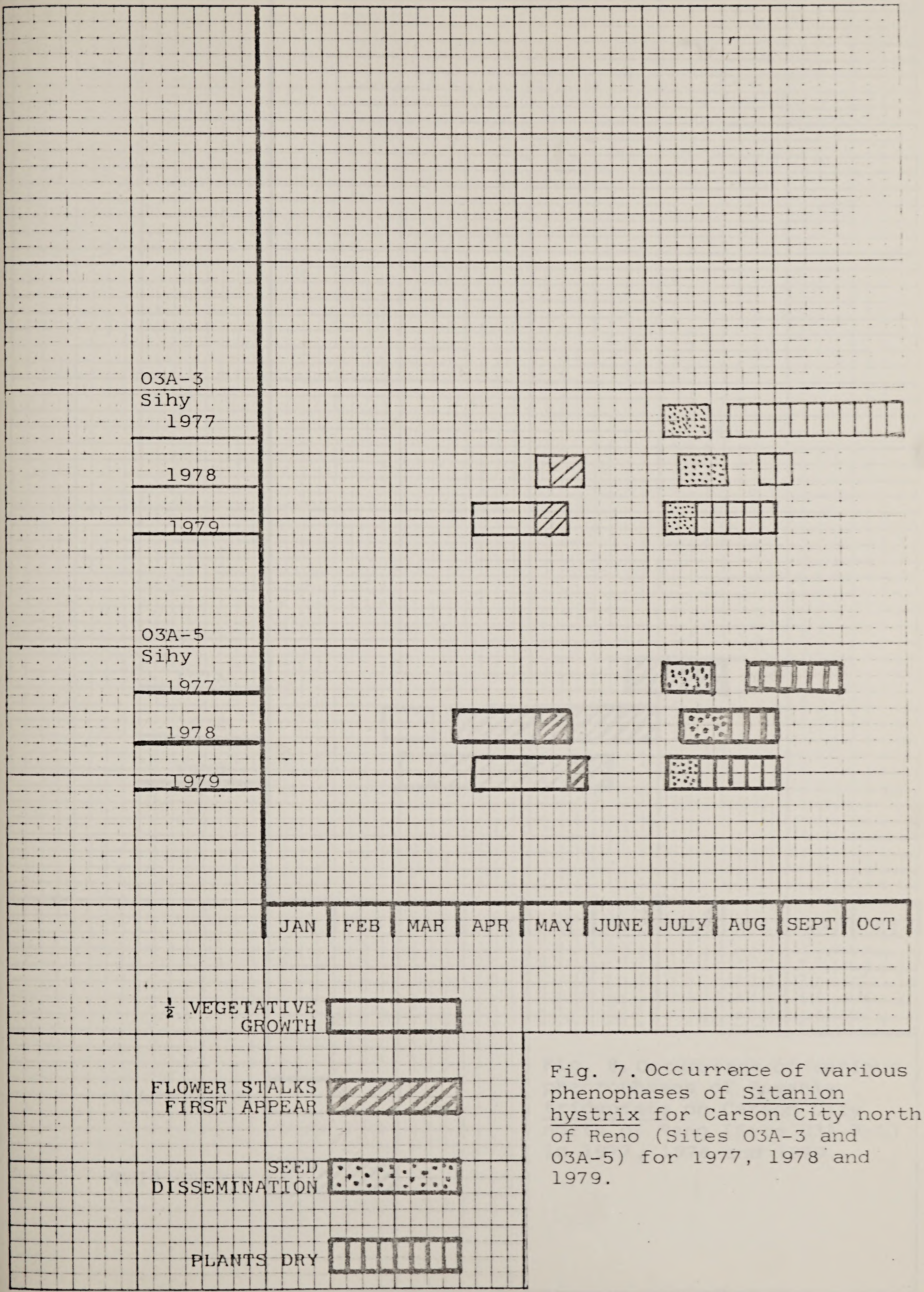


Fig. 7. Occurrence of various phenophases of *Sitanion hystrix* for Carson City north of Reno (Sites O3A-3 and O3A-5) for 1977, 1978 and 1979.

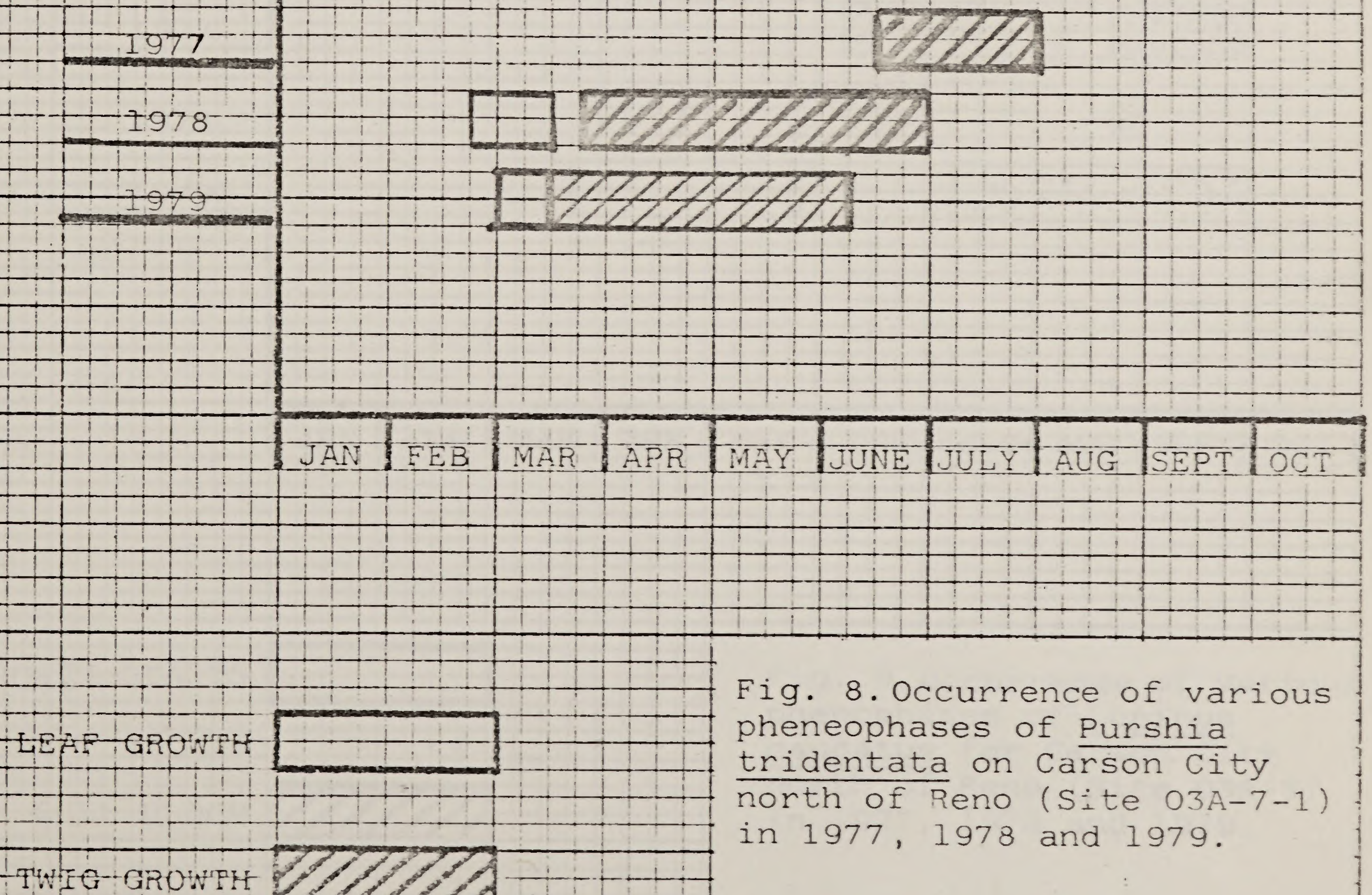


Fig. 8. Occurrence of various pheneophases of *Purshia tridentata* on Carson City north of Reno (Site 03A-7-1) in 1977, 1978 and 1979.

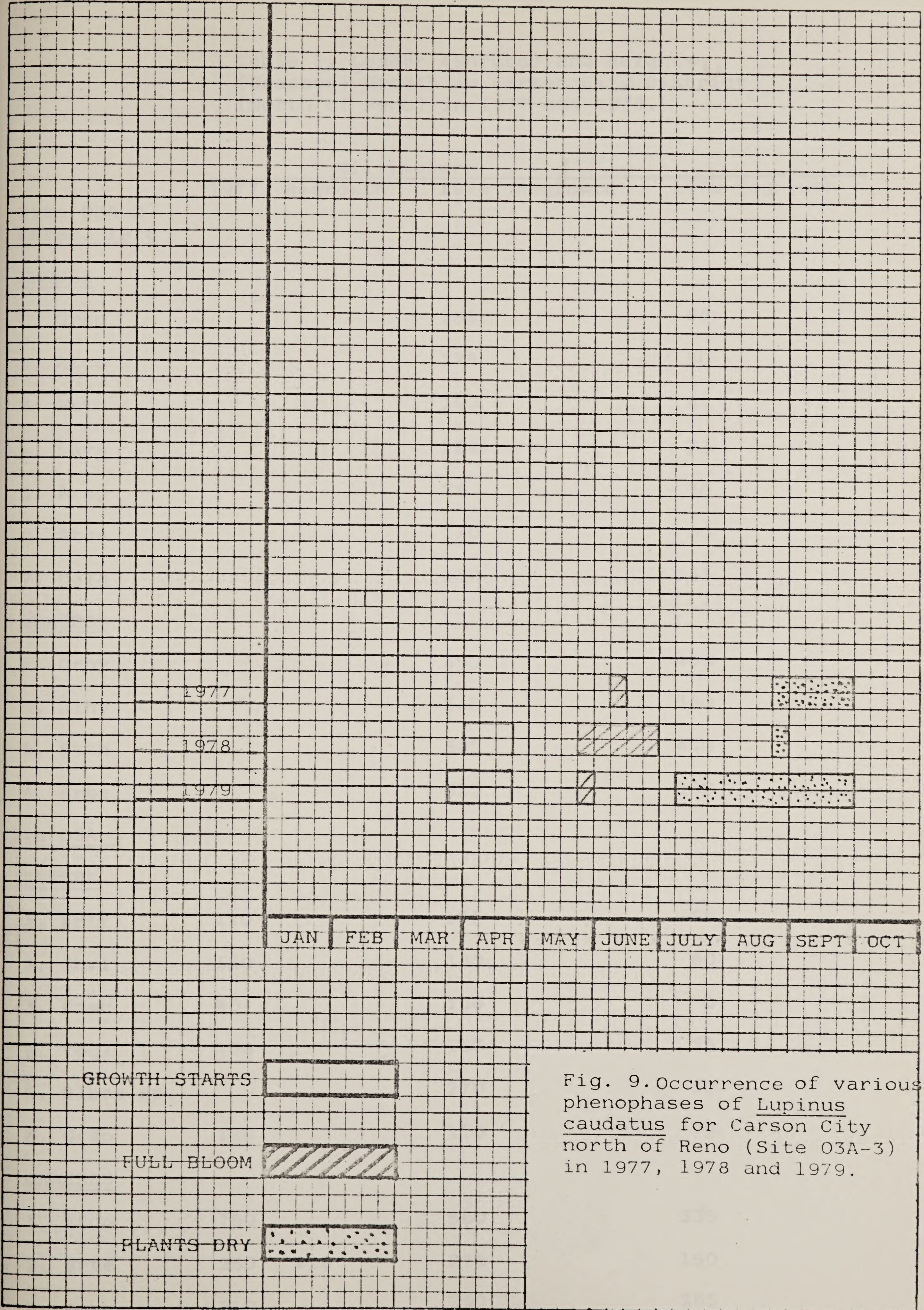


Fig. 9. Occurrence of various phenophases of *Lupinus caudatus* for Carson City north of Reno (Site 03A-3) in 1977, 1978 and 1979.

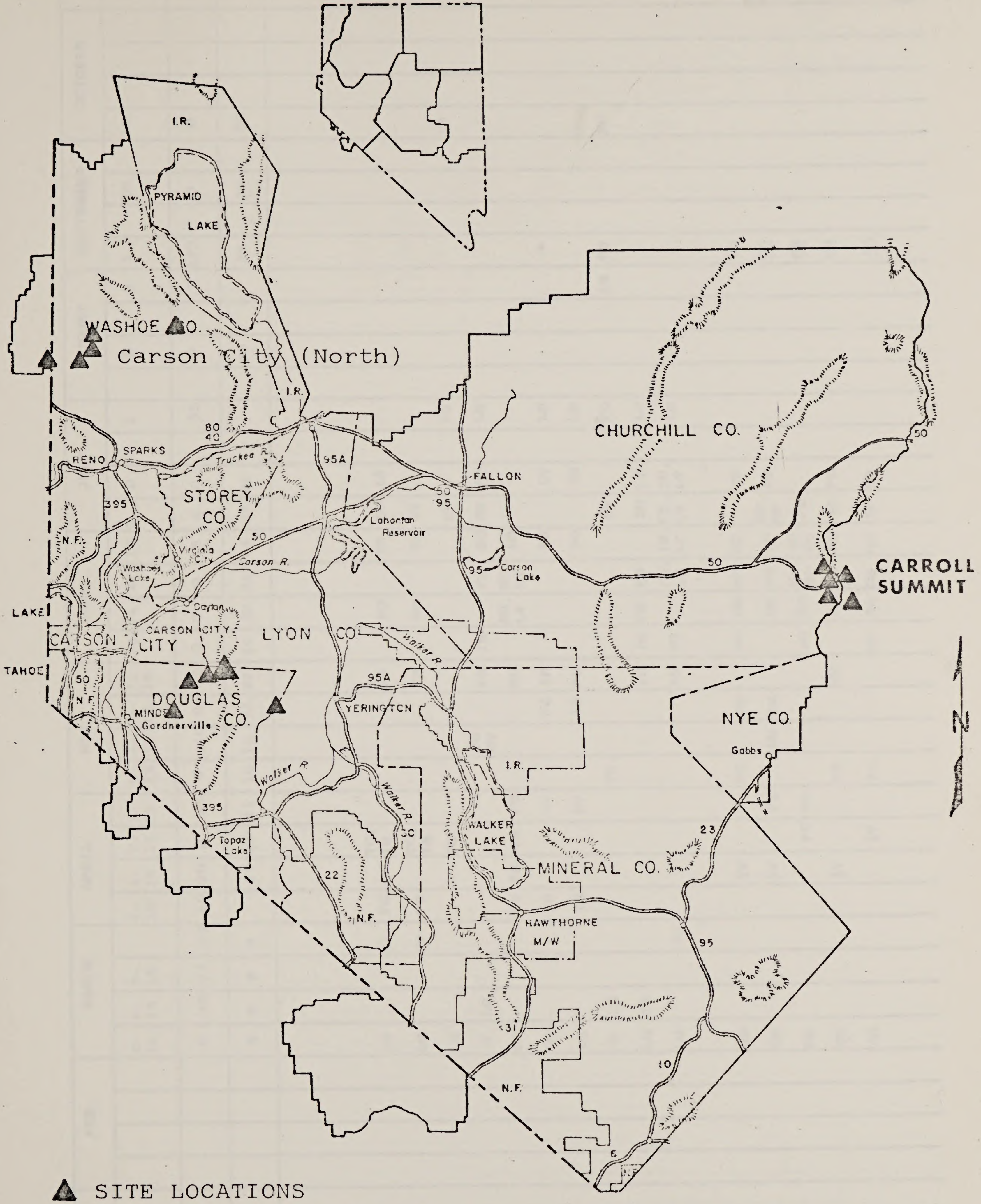
Table 1. Leader (Shrubs) and Height (Grasses) Growth in Carson City District (North of Reno) in 1977 and 1978.

| | Millimeters | | | | | |
|---|---|---|---|---|---|---|
| | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| **Site 03A-2 Estab. 1978** | | | | | | |
| **SHRUBS** | | | | | | |
| 1. Grsp | | | 152 | | 85 | |
| 2. Atco | | | 175 | | 50 | |
| 3. Artr | | | 190 | | 65 | |
| 4. Save | | | 160 | | 65 | |
| 5. Arsp | | | 78 | | 30 | |
| 6. Atca | | | 120 | | 50 | |
| 7. Cela | | | 180 | | 83 | |
| **GRASSES** | | | | | | |
| 1. Orhy | | | 490 | | 400 | |
| 2. Sihy | | | 340 | | 360 | |
| 3. Stth | | | 505 | | 440 | |
| 4. Brte | | | 315 | | 180 | |
| **Site 03A-3** | | | | | | |
| **SHRUBS** | | | | | | |
| 1. Artr | 170 | | 175 | | 65 | |
| 2. Chvi | 150 | | 180 | | 80 | |
| 3. Pran | 80 | | 150 | | 0 | |
| 4. Tegl | 160 | | 160 | | 55 | |
| 5. Ribes sp. | | | 270 | | 50 | |
| 6. Grsp | 120 | | 110 | | 73 | |
| **GRASSES** | | | | | | |
| 1. Stco | 750 | | 560 | | 335 | |
| 2. Brte | 250 | 220 | 225 | | 150 | |
| 3. Orhy | 310 | | 260 | | 265 | |

|  | Millimeters |  |  |  |  |  |
|---|---|---|---|---|---|---|
|  | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 03A-3 con't |  |  |  |  |  |  |
| GRASSES |  |  |  |  |  |  |
| 1.Sihy | 230 |  | 320 |  | 280 |  |
| FORBS |  |  |  |  |  |  |
| 1.Luca | 180 |  | 470 |  | 160 |  |
| Site 03A-4 |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |
| 1. Tegl | -- |  | 230 |  | 35 |  |
| 2.Atca | 135 |  | 130 |  | 65 |  |
| 3.Chvi | -- |  | 110 |  | 59 |  |
| GRASSES |  |  |  |  |  |  |
| 1.Agcr | 70 |  | 920 |  | 870 |  |
| 2.Elci | 875 |  | 1300 |  | 1030 |  |
| 3.Agin | 500 |  | 890 |  | 660 |  |
| 4.Sihy | 280 |  | 500 |  | 530 |  |
| 5.Sece | 900 |  | 1200 |  | 650 |  |
| 6.Brte | 260 |  | 280 |  | 120 |  |
| FORBS |  |  |  |  |  |  |
| 1.Mesa | 860 |  | 600 |  | 700 |  |
| Site 03A-7-1 |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |
| 1.Artr | 150 |  | 170 |  | 65 |  |
| 2.Putr | 35 |  | 100 |  | 47 |  |
| 3.Chvi | 180 |  | 160 |  | 75 |  |
| 4.Ribes sp. | 60 |  | 155 |  | 15 |  |
| 5.Tegl | 175 |  | 245 |  | 45 |  |

| | Millimeters | | | | | |
|---|---|---|---|---|---|---|
| Site 03A-7-1 con't | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| GRASSES | | | | | | |
| 1.Orhy | 480 | | 380 | | 340 | |
| 2.Stth | 490 | | 380 | | 275 | |
| 3.Brte | 280 | | 130 | | 140 | |
| 4.Sihy | 400 | | 390 | | 330 | |
| 5.Feme | 22 | | 45 | | 45 | |
| 6.Agcr | 500 | | 690 | | 380 | (grazed) |
| FORBS | | | | | | |
| 1.Wyeth sp. | 560 | | 480 | | 390 | |
| 2.Luca | 220 | | 340 | | 250 | |
| Site 03A-7-2 | | | | | | |
| SHRUBS | | | | | | |
| 1.Cela | 125 | | 40 | | 0 | |
| 2.Artr | 165 | | 200 | | 70 | |
| 3.Ceve | 140 | | 135 | | 39 | |
| 4.Ribes sp. | 105 | | 180 | | 45 | |
| 5.Chvi | 130 | | 120 | | 80 | |
| 6.Putr | 100 | | 110 | | 0 | |
| 7.Teca | 190 | | 180 | | 35 | |
| 8.Chna | | | 180 | | -- | |
| GRASSES | | | | | | |
| 1.Mebu | 300 | | 315 | | 245 | |
| 2.Posa | 90 | | 300 | | 180 | |
| 3.Sihy | 460 | | 285 | | 280 | |
| 4.Stth | 470 | | 340 | | 330 | |
| 5.Brte | | | 225 | | 210 | |

|  | Millimeters |  |  |  |  |  |
|---|---|---|---|---|---|---|
|  | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site O3A--7-2 con't |  |  |  |  |  |  |
| FORBS |  |  |  |  |  |  |
| 1.Luca | 250 |  | 320 |  | 300 |  |
| 2.Wyeth sp. | 530 |  | 490 |  | 520 |  |
| Site O3A-5 |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |
| 1.Grsp | 45 |  | 150 |  | 75 |  |
| 2.Artr | 135 |  | 200 |  | 70 |  |
| 3.Chvi | 120 |  | 195 |  | 75 |  |
| 4.Ribes sp. | 55 |  | 100 |  | 0 |  |
| GRASSES |  |  |  |  |  |  |
| 1.Brte | 230 |  | 210 |  | 135 |  |
| 2.Stco | 490 |  | 450 |  | 315 |  |
| 3.Orhy | 310 |  | 400 |  | 285 |  |
| 4.Sihy | 280 |  | 430 |  | 350 |  |
| FORBS |  |  |  |  |  |  |
| 1.Basa | 280 |  | 450 |  | 330 |  |



▲ SITE LOCATIONS
(Not all sites shown due
to closeness)

## CARSON CITY DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | 3-14 | S-15 | 2-15 | | 1-15 | 4-15 | 7-15 | S-15 | 6-15 | 4-15 | 7-15 | 12-15 | 16 | 24 | 27 | 19 | D | D | | 2 | | D | | 3 | 3 | | 10 | | 15 | | | | | | | |
| Precip. (in) | | | | | | | | | 0 | .05 | .17 | .12 | .10 | .20 | 0 | .45 | 0 | .40 | 0 | .10 | 0 | 0 | 0 | .5 | 0 | 0 | | .55 | | 0 | | .7 | 2.72 | | 0 | | 0 | | | | | | | |
| S.T.-°C | | | | | | | | | 9 | 6 | 8 | 8 | | 17 | 11 | 11 | 16 | 16 | 21 | 22 | 24 | 24 | 24 | 24 | 28 | 24 | | | | 23 | | | 23 | | 20 | | 20 | | | | | | | |
| CARSON CITY NO. 03A-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grsp ♀ | | | | | | | | | LG | | | BV | FG | | TG,<br>1B | | | | | FB | | BO | | SR | SD | LY | | | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | LG | | | BV | FG | | TG,<br>1B | | | | | FB | | BO | | SR | LY | -- | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | LG | | | | | | TG | | | | | | | | | | BV | | | FG | | | | | | | | | 1B | | | | | | | |
| Save | | | | | | | | | D | LG | | | | | | | | TG,<br>BV | | FG | 1B | | FB | BO | SR | SD | | LD | | | | | | | | | | | | | | | | |
| Arsp | | | | | | | | | LG | | | | BV | TG | 1B | FB | | | | BO | | SR,<br>LY | SD,<br>LY | LD | | | | | | | | | | | | | | | | | | | | |
| Atca ♀ | | | | | | | | | LG | | | | TG | | | -- | | | FG | 1B | | | | FB | | LY | | LD | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | LG | | | | TG | | | BV | | | 1B | FB | | | | BO | | SD | | LD | | | | | | | | | | | | | | | | |
| Chvi | | | | | | | | | D | LG | | | | | | | TG | | | | | | | | BV | | | FG | | | | 1B | FB | | | | BO | | | | | | | |
| Cela | | | | | | | | | LG | TG | | | | | | | | | | FG | 1B | FB | BO | | SR | LY | | LD | | | | | | | | | | | | | | | | |
| Tegl | | | | | | | | | LG | | | TG | | | | | | | | BV | FG | | FG,<br>LY | 1B,<br>LY | FB,<br>LY | SD,<br>LY | | LD | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | GS | | | | | ½V | | | FS | | HO | | An | DS | HS | SD | | PD | | | | | | | GS | | | | | | | | | | | |
| Sihy | | | | | | | | | GS | | | | | ½V | | FS | | HO | An | | | DS | HS | SD | SD,<br>BD | PD | | | | | | | GS | | | | | | | | | | | |
| Brte | | | | | | | | | GS | | | | | | FS | HO | | | | | An | DS | HS,<br>BD | SD,<br>BD | PD | | | | | | | | GS | | | | | | | | | | | |
| Stth | | | | | | | | | GS | | | | | ½V | | | FS | | | HO | | An | DS | HS | SD | PD | | | | | | | GS | | | | | | | | | | | |
| Stco | | | | | | | | | GS | | | | | | ½V | | FS | | | | HO | An | DS | HS | SD | PD | | | | | | | GS | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | 2-15 | S-15 | 1-15 | S-15 | 1-15 | 3-15 | 2-15 | S-15 | 3-15 | 6-15 | 7-15 | 8-15 | 19 | 26 | 28 | 15 | D | D | | 2 | D | | | 2 | D | | 10 | | 14 | | | | | | |
| Precip. (in) | | | | | | | | | 0 | .05 | .16 | .16 | .05 | .16 | .10 | 129 | 0 | .5 | 0 | 0 | 0 | 0 | 0 | .75 | 0 | 0 | | .40 | 0 | | | 1.4 | 1.0 | | 0 | | 0 | | | | | | |
| S.T.-°C | | | | | | | | | 5 | 5 | 4 | 6 | | 12 | 10 | 10 | 17 | 14 | 18 | 19 | 24 | 26 | 21 | 20 | 23 | 23 | | | 21 | | | | 20 | | 17 | | 20 | | | | | | |
| CARSON CITY NO. 03A-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | LG | | | | | | | TG | | | | | | | | | | BV | | FG | | | | | | | 1B | | | | | | | | |
| Chvi | | | | | | | | | D | LG | | | | | | | TG | | | | | | | | BV | FG | | | | | | 1B | FB | | | | BO | | | | | | |
| Pran | | | | | | | | | D | LG | | | | | | | BV | 1B | FB | BO | | | | | SR | LD | | | | | | | | | | | | | | | | | |
| Tegl | | | | | | | | | LG | | | | | | | | | | TG | | BV | FG | | | | 1B | | BO | | | | SR | SD | | SD, LY | | LY | | | | | | |
| Grsp ♀ | | | | | | | | | LG | | | | | | | BV | TG, FG | | | 1B | 1B | FB | | BO | SR, LY | LD | | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | LG | | | | | | | BV | TG, FG | | | 1B | FB | FB | | BO | SR, LY | LD | | | | | | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | LG | | | BV | FG | 1B | | FB | | | BO | TG, BO | | | | | SR | LD | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stco | | | | | | | | | D | GS | | | | | ½V | | | | | FS | HO | An | DS | | HS | SD, BD | | PD | | | | | GS | | | | | | | | | | |
| Brte | | | | | | | | | GS | | | | | | ½V | | | FS | HO | | An | DS, BD | HS, BD | SD, BD | PD | | | | | | | | GS | | | | | | | | | | |
| Orhy | | | | | | | | | D | GS | | | | | ½V | | | | FS | HO | An | DS | | | HS | SD | | PD | | | | | GS | | | | | | | | | | |
| Sihy | | | | | | | | | GS | | | | | ½V | | | | FS | | HO | An | DS | | | HS | BD | | PD | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Luca | | | | | | | | | D | | | GS | | | | FS | | | 1B | FB | BO | SR | | | DS, BD | PD | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN |  |  |  | FEB |  |  |  | MARCH |  |  |  | APRIL |  |  |  | MAY |  |  |  | JUNE |  |  |  | JULY |  |  |  | AUGUST |  |  |  | SEPTEMBER |  |  |  | OCTOBER |  |  |  | NOVEMBER |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) |  |  |  |  |  |  |  |  | 3-15 | S-15 | 1-15 | S-15 | 2-15 | 3-15 | 3-15 | S—15 | 2-15 | 4-15 | 4-15 | 12-15 | 26 | 27 | 29 | 21 | D | D |  | 2 | D |  |  |  | 5 |  | 18 |  | 23 |  |  |  |  |  |  |  |
| Precip. ( in) |  |  |  |  |  |  |  |  | 0 | .11 | .22 | .26 | .035 | .07 | .11 | .55 | 0 | .54 | 0 | -- | 0 | 0 | 0 | .04 | 0 | 0 |  | .8 | 0 |  |  | -- | 1. |  |  | 0 | 0 |  |  |  |  |  |  |  |
| S.T.-$^{o}$C |  |  |  |  |  |  |  |  | 7 | 9 | 6 | 6 | -- | 11 | 11 | 13 | 16 | 18 | 19 | 21 | 26 | 26 | 24 | 23 | 24 | 22 |  | -- | 23 |  |  | 24 | 20 |  |  | 19 | 20 |  |  |  |  |  |  |  |
| CARSON CITY NO. 03A-4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SHRUBS: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Atca |  |  |  |  |  |  |  |  | D | LG |  |  |  |  |  |  |  |  |  |  | TG |  |  | BV |  | 1B |  | FB | BO |  |  | SR |  |  | SD |  |  |  |  |  |  |  |  |  |
| Chvi |  |  |  |  |  |  |  |  | LG |  |  |  |  |  |  |  |  | TG |  |  |  |  |  |  | BV |  |  | FG |  |  |  | 1B | FB |  |  |  | BO |  |  |  |  |  |  |  |
| Tegl |  |  |  |  |  |  |  |  | D | LG |  |  |  |  |  |  |  |  |  | TG |  |  |  |  |  | FG |  |  | FB |  |  | BO | SR |  | SD |  | LY |  |  |  |  |  |  |  |
| GRASSES: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Agcr |  |  |  |  |  |  |  |  | GS |  |  |  |  |  | $\frac{1}{2}$V |  |  |  | FS | HO |  |  |  | An |  | HS, BD |  | SD, BD | BD |  |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |
| Elci |  |  |  |  |  |  |  |  | GS |  |  |  |  |  | $\frac{1}{2}$V |  |  |  | FS |  | HO |  | An |  | DS | SD, BD |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Agin |  |  |  |  |  |  |  |  | GS |  |  |  |  |  | $\frac{1}{2}$V |  |  |  | FS |  |  |  | HO |  |  | An |  | HS, BD | SD, BD |  |  | BD | PD |  |  |  |  |  |  |  |  |  |  |  |
| Sihy |  |  |  |  |  |  |  |  | GS |  |  |  |  | $\frac{1}{2}$V |  |  | FS |  |  | HO | An | DS | DS, BD |  | HS, BD | BD |  | PD |  |  |  |  | GS |  |  |  |  |  |  |  |  |  |  |  |
| Sece |  |  |  |  |  |  |  |  | D |  |  |  | GS |  |  |  |  | $\frac{1}{2}$V | FS |  | HO | An | DS |  |  | HS, BD |  | SD, BD | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Brte |  |  |  |  |  |  |  |  | GS |  |  |  |  |  | $\frac{1}{2}$V |  |  | FS | HO |  | An | DS | HS, BD | SD, BD | PD |  |  |  |  |  |  |  | GS |  |  |  |  |  |  |  |  |  |  |  |
| FORBS: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mesa |  |  |  |  |  |  |  |  | D | GS |  |  |  |  |  |  |  |  |  |  | FS | 1B | FB |  | BO |  |  | SR |  |  |  | BD | PD |  |  |  |  |  |  |  |  |  |  |  |
| Onobr sp. |  |  |  |  |  |  |  |  | GS |  |  |  |  |  |  |  |  |  |  | FS |  |  |  | BO | SR | BD |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | S-15 | S-15 | 2-15 | S-15 | 5-15 | 4-15 | 8-15 | S-15 | 5-15 | 3-15 | 8-15 | 12-15 | 20 | 24 | 27- | 17 | D | D | | 2 | 27 | | | 2 | 7 | | 12 | | 16 | | | | | | | |
| Precip. (in) | | | | | | | | | 0 | .06 | .19 | .24 | .02 | .20 | .03 | .57 | 0 | .5 | 0 | 0 | 0 | 0 | 0 | .8 | 0 | 0 | | .4 | 0 | | | .6 | 1.5 | | 0 | | 0 | | | | | | | |
| S.T.-°C | | | | | | | | | 4 | 7 | 4 | 5 | | 12 | 12 | 8 | 17 | 16 | 20 | 20 | 26 | 25 | 20 | 18 | 24 | 21 | | | 20 | | | | 22 | | 18 | | 19 | | | | | | | |
| CARSON CITY NO. 03A-5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grsp ♀ | | | | | | | | | LG | | | | | | | LG | BV | | FG | 1B | FB | | FB | BO | SR | SD, LY | | LY | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | LG | | | | | | | BV | FG | | FG | 1B | FB | | BO | BO | SR | SD, LY | | LY | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | LG | | | | | | | TG | | | | | | | | | | BV | | FG | | | | | | | 1B | | | | | | | | | |
| Chvi | | | | | | | | | LG | | | | | | | | TG | | | | | | | | BV | | | | FG | | | 1B | FB | | | | BO | | | | | | | |
| Ribes sp. | | | | | | | | | LG | | BV | | FG | 1B | | FB | | | BO | | SR, LY | SD, LY | | LD | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | GS | | | | | | ½V | | | FS | HO | | An | DS, BD | HS, BD | SD, BD | PD | | | | | | | | GS | | | | | | | | | | | |
| Stco | | | | | | | | | GS | | | | | | ½V | | | | | | | HO | An | DS | HS | BD | | PD | | | | | GS | | | | | | | | | | | |
| Orhy | | | | | | | | | GS | | | | | | ½V | | | | FS | HO | An | | DS | HS | SD | PD | | | | | | | GS | | | | | | | | | | | |
| Sihy | | | | | | | | | GS | | | | | ½V | | | | | FS | | HO | An | | DS | HS, BD | BD | | PD | | | | | GS | | | | | | | | | | | |
| Stth | | | | | | | | | GS | | | | | | ½V | | | | | | | HO | An | DS | HS | BD | | PD | | | | | GS | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Basa | | | | | | | | | | D | | | GS | | | | | | | | | 1B | FB | BO, BD | DS, BD | PD | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | S-15 | S-15 | 1-15 | S-15 | 1-15 | 2-15 | 2-15 | S-15 | 2-15 | 3-15 | 5-15 | 5-15 | 25 | 25 | 29 | 15 | D | D | | 1 | 3 | | | 3 | 4 | | 15 | | 18 | | | | | | | |
| Precip. (in) | | | | | | | | | 0 | .16 | .22 | .25 | .25 | .2 | 0 | .46 | 0 | .70 | 0 | .05 | 0 | 0 | 0 | .75 | 0 | 0 | | .50 | 0 | | | .65 | 2.0 | | 0 | | 0 | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | 5 | 6 | 4 | 5 | | 8 | 9 | 9 | 15 | 18 | 17 | 18 | 25 | 25 | 22 | 20 | 22 | 21 | | | 22 | | | 27 | 21 | | 20 | | 19 | | | | | | | |
| CARSON CITY NO. 03A-7-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | LG | | | | | | | | TG | | | | | | | | | BV | | FG | | | | | | | 1B | | | | | | | | | |
| Putr | | | | | | | | | LG | | TG | | | | | | | | BV | FB | BO | | | | | SD | | LD | | | | | | | | | | | | | | | | |
| Chvi | | | | | | | | | LG | | | | | | | | | TG | | | | | | | BV | | | FG | | | | 1B | FB | | | | BO | | | | | | | |
| Ribes sp. | | | | | | | | | LG | | | | BV | FG | | 1B | FB | | BO | | | TG, BO | | SR | | LY | | | | | | | | | | | | | | | | | | |
| Tegl | | | | | | | | | | LG | | | | | | | | | TG | | | | | | | FG | | | FB | | | | | | SD | | LY | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | GS | | | | | ½V | | | | FS | | An | | DS | | HS | SD | | PD | | | | | GS | | | | | | | | | | | |
| Stth | | | | | | | | | | GS | | | | | | ½V | | | | FS | HO | An | | DS | HS | SD, BD | | PD | | | | | GS | | | | | | | | | | | |
| Brte | | | | | | | | | GS | | | | | | ½V | | | FS | HO | | An | | DS, BD | HS, BD | SD, BD | PD | | | | | | | GS | | | | | | | | | | | |
| Sihy | | | | | | | | | GS | | | | | | ½V | | | | FS | HO | An | | DS | | HS | SD, BD | | PD | | | | | | | GS | | | | | | | | | |
| Feme | | | | | | | | | GS | | | | | | ½V | | | | FS | HO | | An | DS, BD | HS, BD | SD, BD | PD | | | | | | | | | | | | | | | | | | |
| Agcr | | | | | | | | | GS | | | | | | | ½V | | | | FS | HO | | | gr. | | | | | | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wyeth sp. | | | | | | | | | | | D | | | | GS | | | | FS | 1B | | FB | BO | | SR | BD | | PD | | | | | | | | | | | | | | | | |
| Luca | | | | | | | | | | | D | GS | | | FS | | | | | 1B | FB | BO | SR | DS | BD | PD | | | | | | | | | | | | | | | | | | |

| SYMBOL, 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | S-15 | S-15 | S-15 | S-15 | S-15 | S-15 | 1-15 | S-15 | 2-15 | 2-15 | 4-15 | 4-30 | | 21 | 22 | 14 | 25 | D | | 1 | 24 | | | 30 | 3 | | 9 | | 12 | | | | | | | |
| Precip. (in) | | | | | | | | | 0 | .6 | .41 | .55 | .08 | .09 | .12 | .6 | 0 | .7 | 0 | 0 | | 0 | 0 | 1.0 | 0 | 0 | | .85 | 0 | | | .6 | 2.5 | | 0 | | 0 | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | 4 | 2 | 3 | | 7 | 10 | 12 | 11 | 10 | 19 | 19 | | 20 | 19 | 16 | 20 | 20 | | | 20 | | | | 19 | | 16 | | 18 | | | | | | | |
| CARSON CITY NO. 03A-7-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ceve | | | | | | | | | | LG | | | | | | | | | | TG | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | TG | | | | | | | | | | BV | | FG | | | | | | | | | 1B | | | | | | | |
| Chvi | | | | | | | | | D | LG | | | | | | | | | TG | | | | | | | BV | | FG | | | | 1B | FB | | | | BO | | | | | | | |
| Teca | | | | | | | | | D | | | | | | LG | | | | | | | TG | | | | BV | | FG | FB | | | BO | SR | | SD, LY | | LD | | | | | | | |
| Cela | | | | | | | | | D | | LG | | | | | BV | FG | | 1B | | | BO | | | | SR | | SD | SD, LY | | | LY | | | | | LD | | | | | | | |
| Putr | | | | | | | | | LG | | | | | | | | | | BV | 1B | | BO | | | | SR | | SD | LY | | | LD | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | LG | | | | | | BV | | 1B | | FB | BO | | TG, BO | | | SR | SD, LY | | LD | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stth | | | | | | | | | D | | GS | | | | | | | $\frac{1}{2}$V | | | | An | | DS | | HS | | SD, BD | BD | | | PD | | | GS | | | | | | | | | |
| Sihy | | | | | | | | | GS | | | | | | $\frac{1}{2}$V | | | | FS | | | An | DS | | HS | SD | | SD, BD | BD | | | PD | GS | | | | | | | | | | | |
| Posa | | | | | | | | | GS | | | | | $\frac{1}{2}$V | | FS | HO | | An | | | DS, BD | SD, BD | PD | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | GS | | | | | | $\frac{1}{2}$V | | | | | HO | | An | DS | HS | SD, BD | PD | | | | | | | | | | | | | | | | | | |
| Mebu | | | | | | | | | GS | | | | | | | | | HO | An | | | DS | HS | | SD | PD | | | | | | | | | | | | | | | | | | |
| Elci | | | | | | | | | D | | | | | GS | | | | $\frac{1}{2}$V | | | | | | | FS | HO | | DS | HS | | | SD | SD<br>BD | | | | BD | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Luca | | | | | | | | | D | | | | | | | GS | | | | FS | | FB | BO | SR | DS | BD | | PD | | | | | | | | | | | | | | | | |
| Wyeth sp. | | | | | | | | | D | | | | | | GS | | | | | FS | | FB | | | BO | | | DS, BD | BD | | | | | | | | | | | | | | | |

BATTLE

CARROLL
SUMMIT

## ELY

The phenology of bluestem wheatgrass (*Agropyron smithii*) in the northern desert shrub type in Steptoe Valley shows a relatively concise developmental pattern after 4 years and no surprises (Figure 1). The same thing can be said for crested wheatgrass (*Agropyron cristatum*; Figure 2).

The height growth of bluestem wheatgrass varied considerably among years, but does not seem to be strongly regulated by soil moisture, at least as it was recorded in this study (Figure 3). Possibly a more quantitative analysis of soil moisture would reveal a stronger relationship. Leader growth is also likely regulated to some extent by temperatures in May and June. The leader growth of green rabbitbrush (*Chrysothamnus viscidiflorus*) was much less variable (Figure 4).

The growth and development of bluestem and crested wheatgrass plus Indian ricegrass (*Oryzopsis hymenoides*) was quite uniform over the four years of the study (Figure 5 and Figure 8). The greatest variation occurs with the onset of drying at the end of the growing season.

Development of bitterbrush (*Purshia tridentata*) in the pinyon-juniper woodland also exhibits no surprises as departure from the general phenological pattern recorded over the four years of the study (Figure 6). Conversely, the initiation of leaf and twig growth of bitterbrush, shadscale (*Atriplex confertifolia*), and gooseberry (*Ribes* sp.) is characterized by great annual differences (Figure 7).

Examination of the phenological data for all grasses

indicates that cool-season grasses such as squirreltail grass (Sitanion hystrix) reach ½ vegetative growth by mid-April (04-2), while a warm-season grass such as Indian ricegrass growing on the same site reaches the same stage a month later (by mid-May). Numerous other observations can be made concerning this data, each of which sheds further light on vegetation management.

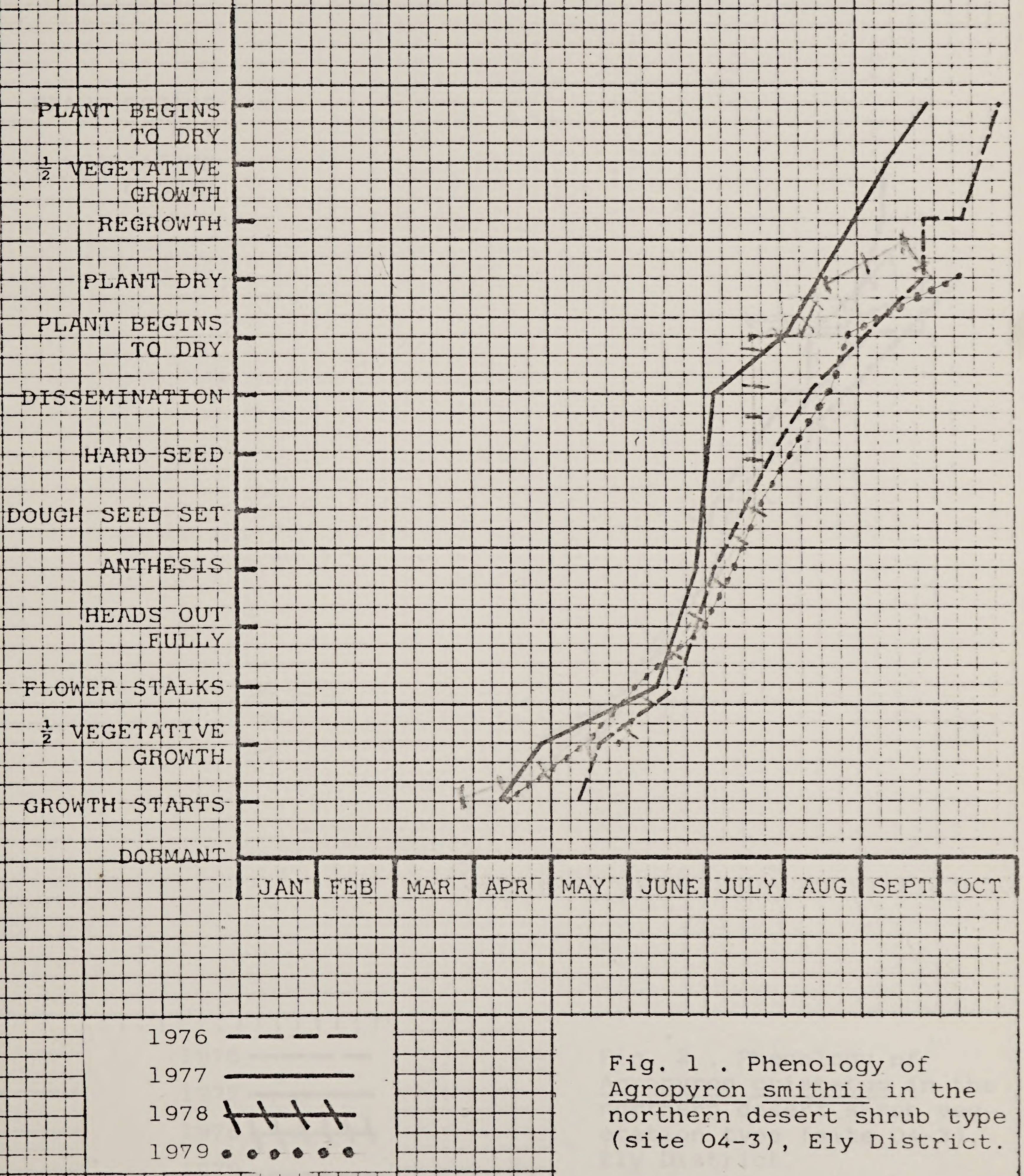


Fig. 1 . Phenology of Agropyron smithii in the northern desert shrub type (site 04-3), Ely District.

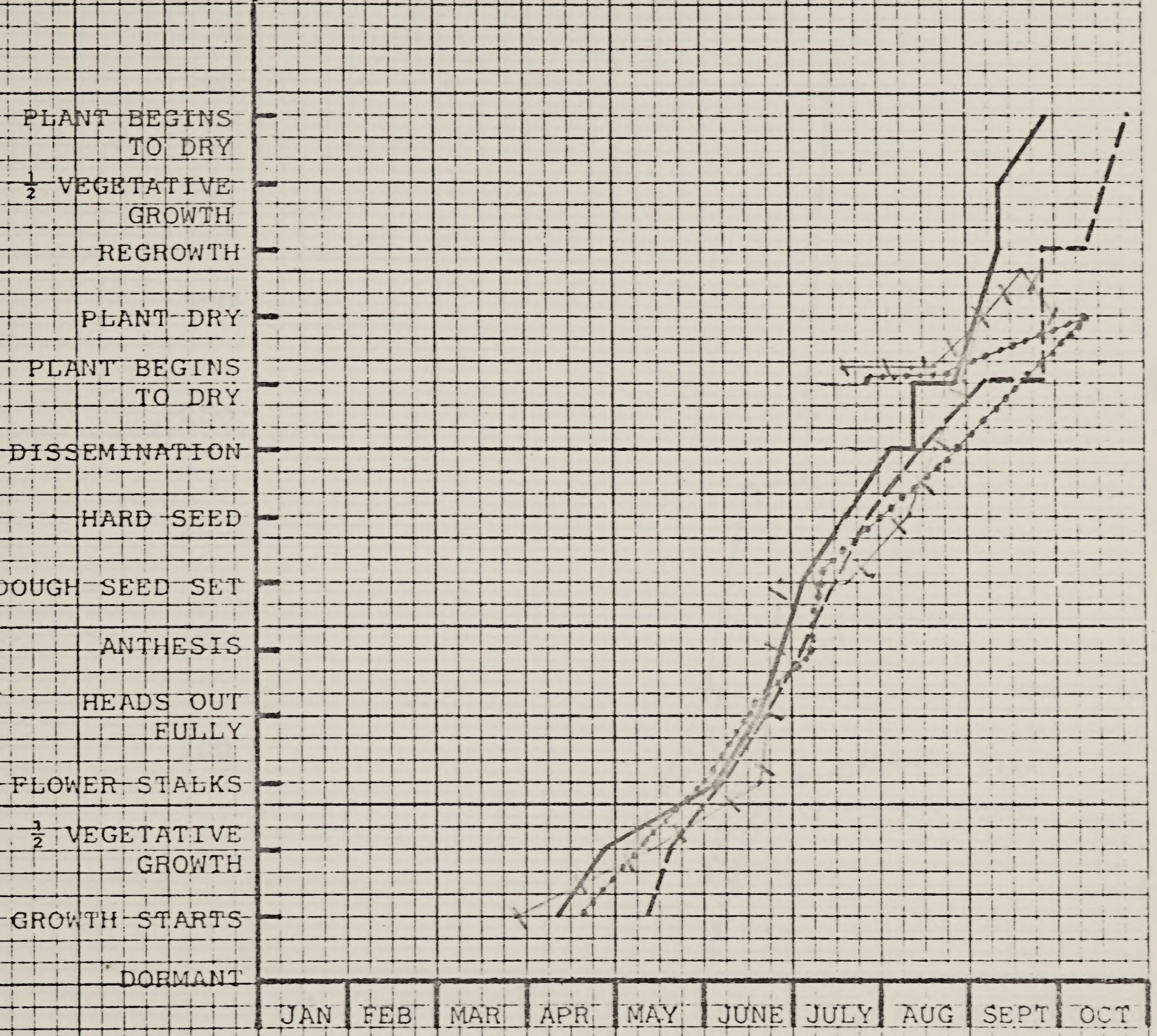


Fig. 2 . Phenology of *Agropyron cristatum* in the northern desert shrub vegetation type (site 04-3), Ely District.

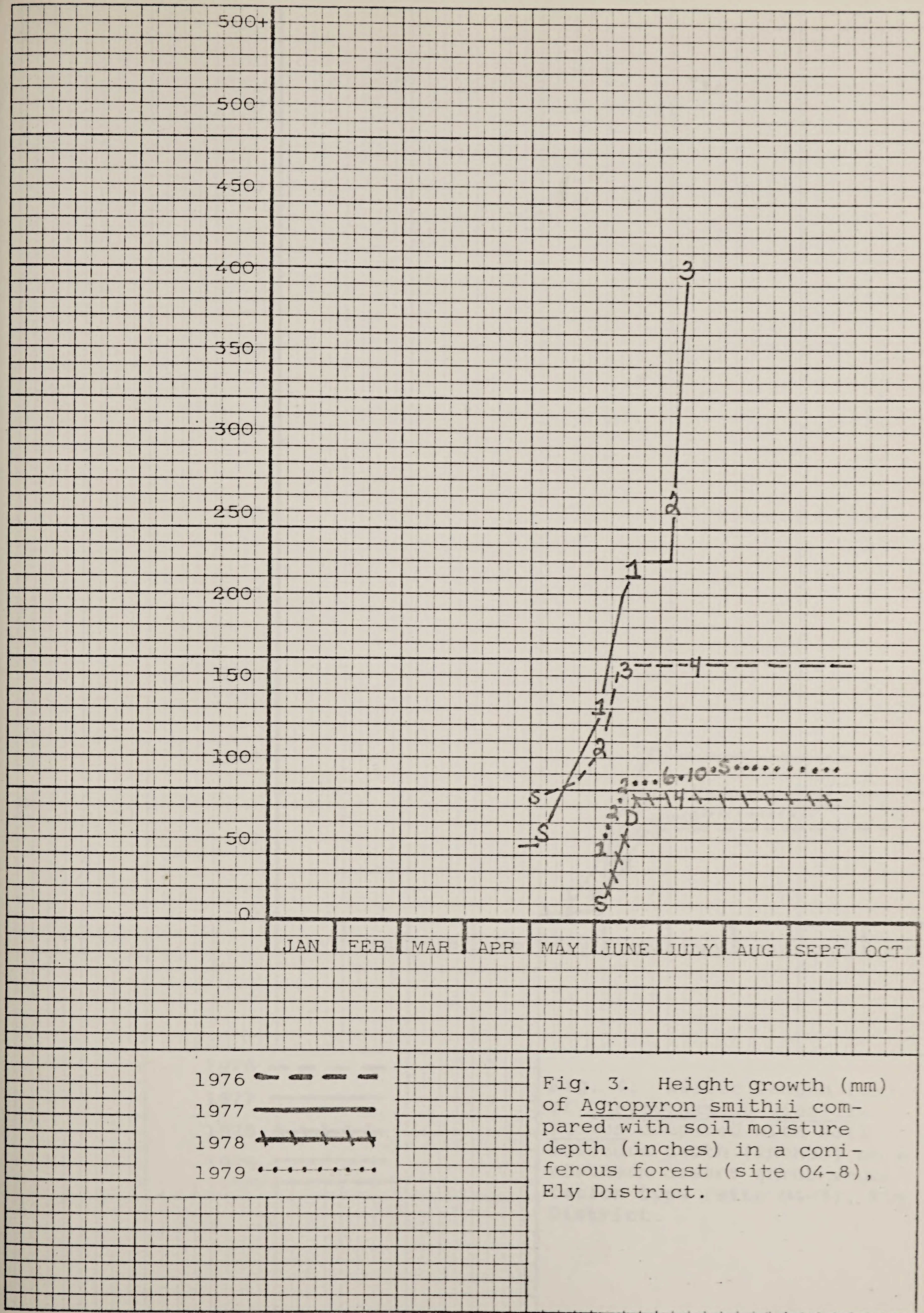


Fig. 3. Height growth (mm) of Agropyron smithii compared with soil moisture depth (inches) in a coniferous forest (site 04-8), Ely District.

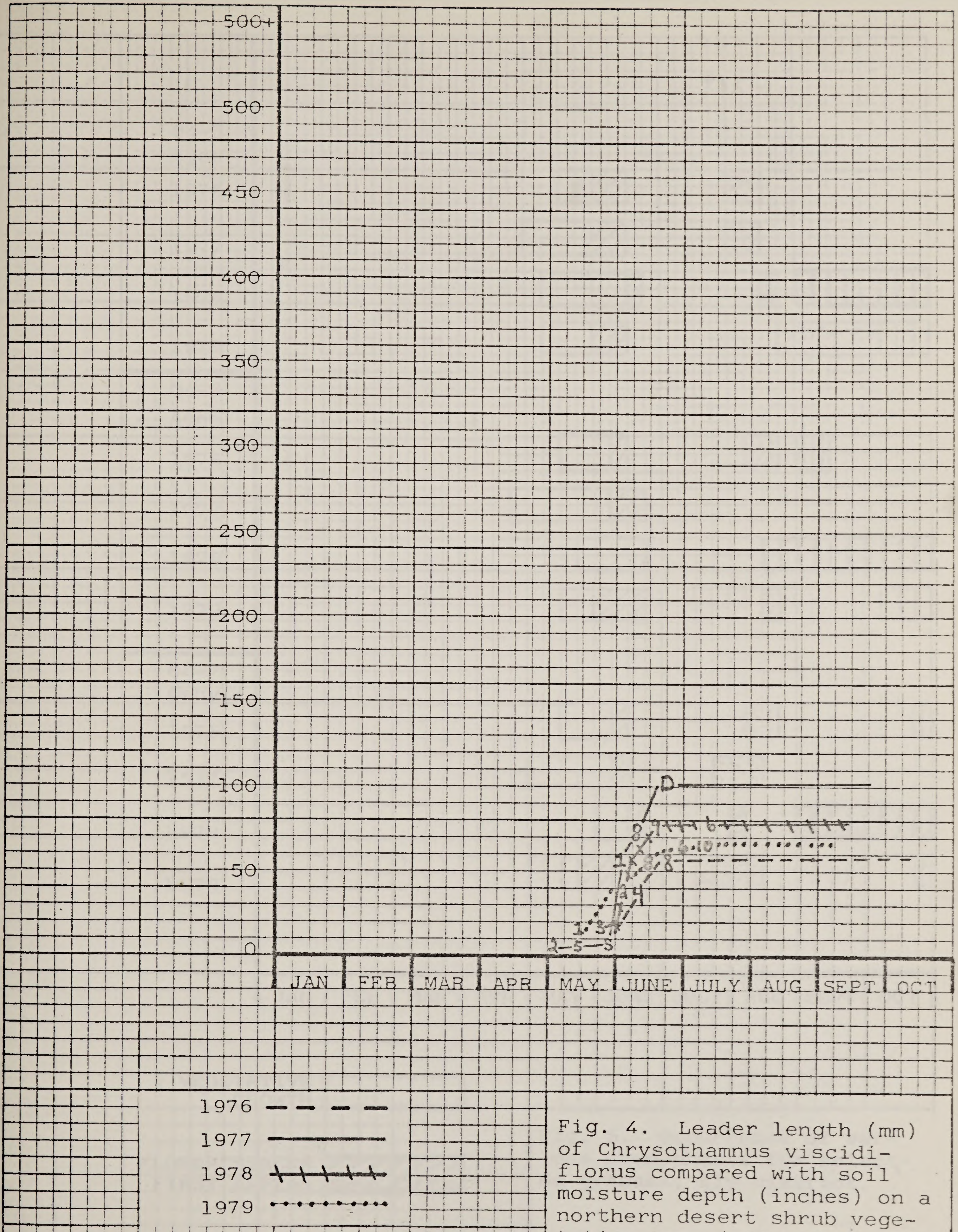


Fig. 4. Leader length (mm) of Chrysothamnus viscidiflorus compared with soil moisture depth (inches) on a northern desert shrub vegetation type (site 04-3), Ely District.

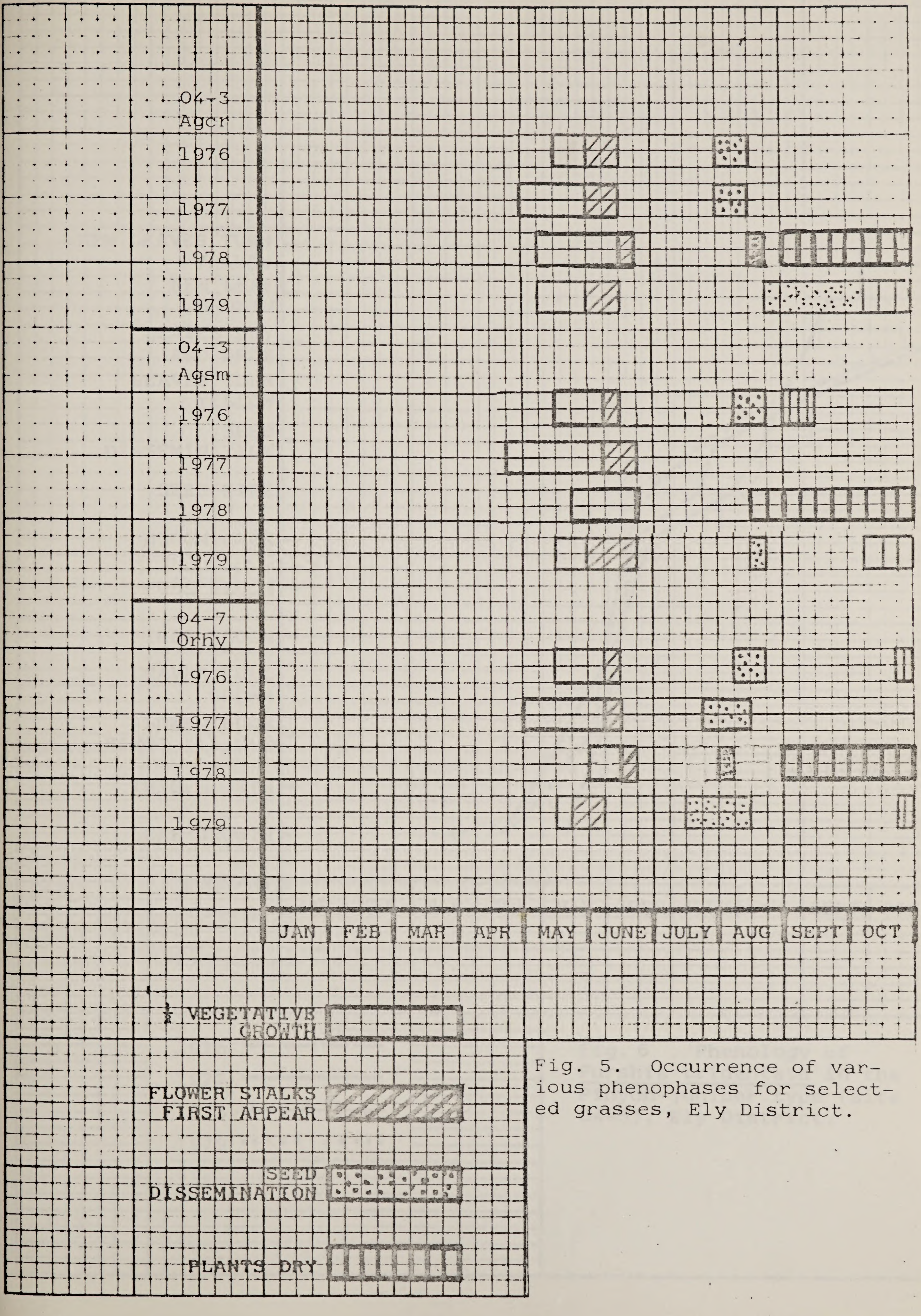


Fig. 5. Occurrence of various phenophases for selected grasses, Ely District.

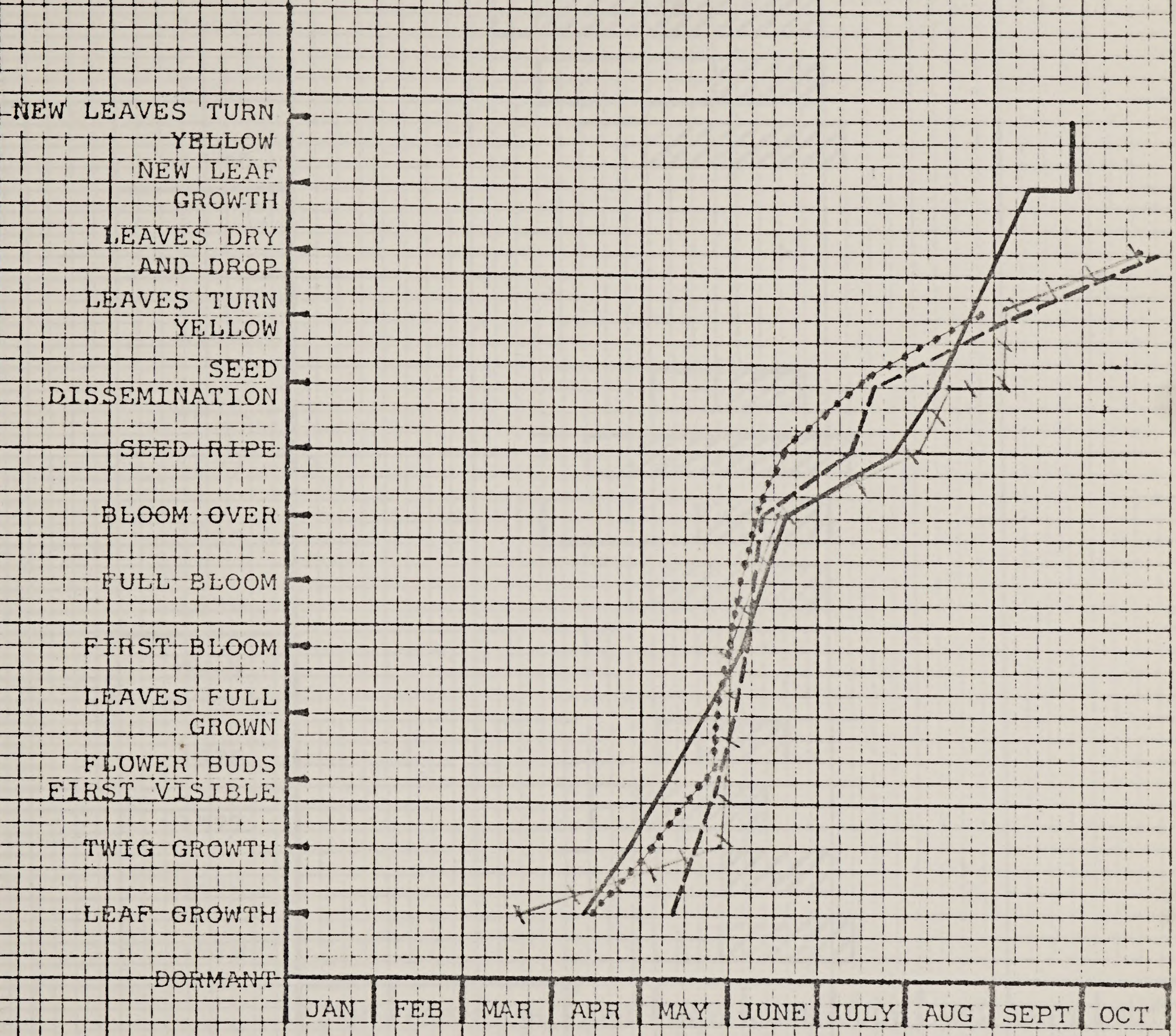


Fig. 6 . Phenology of *Purshia tridentata* in the Pinyon-juniper type (site 04-5), Ely District.

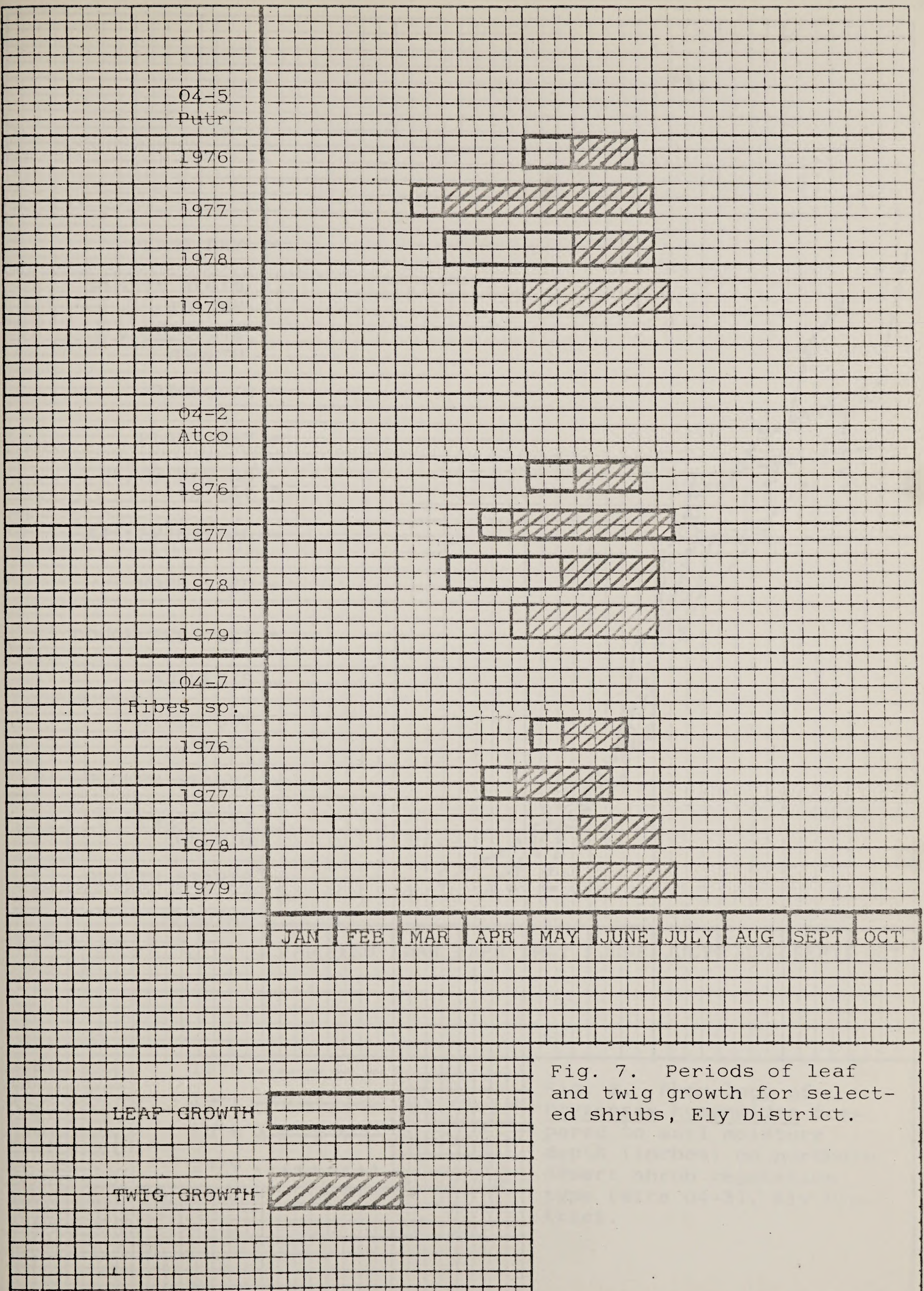


Fig. 7. Periods of leaf and twig growth for selected shrubs, Ely District.

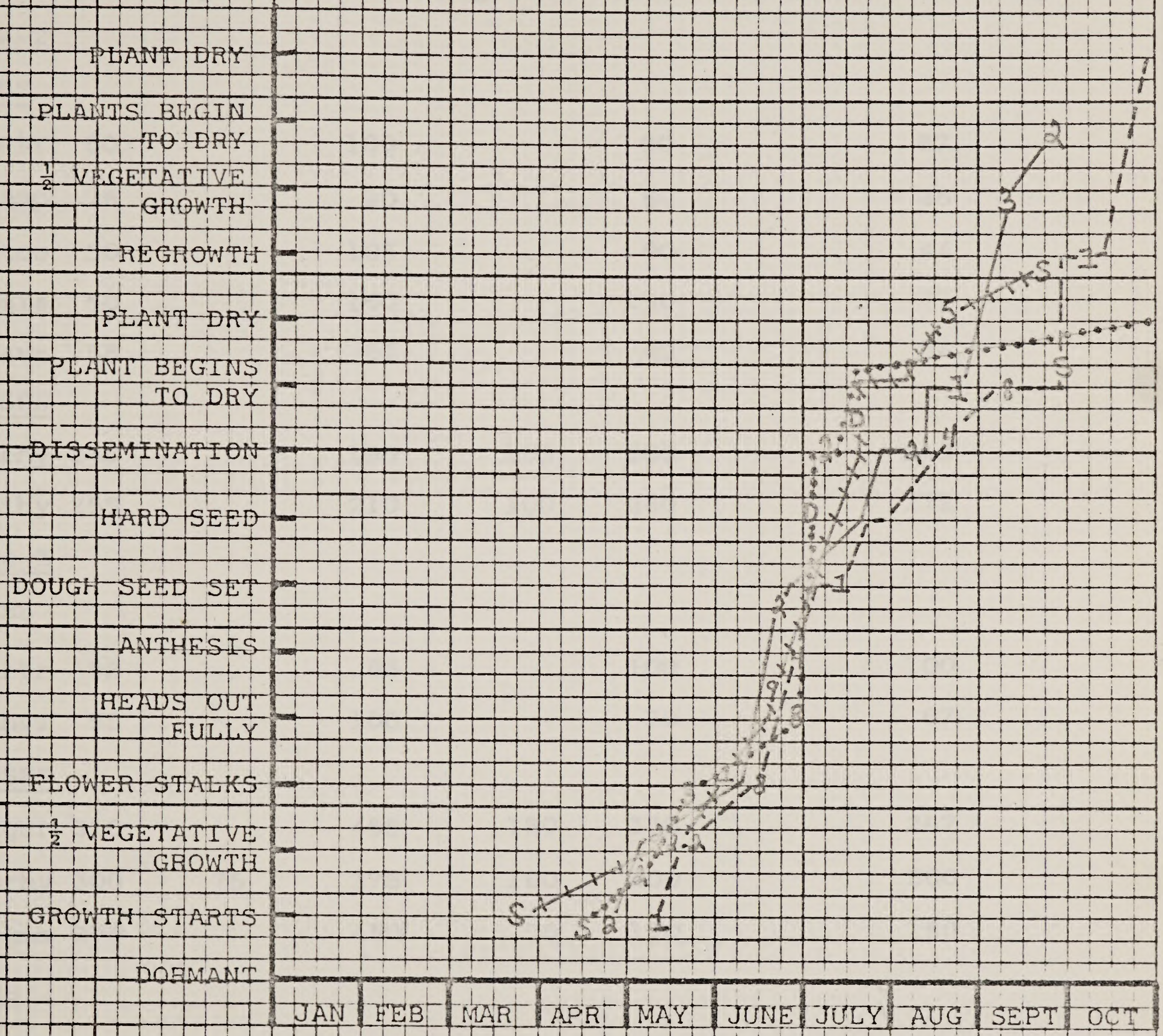


Fig. 8. Phenology of Oryzopsis hymenoides compared to soil moisture depth (inches) on northern desert shrub vegetation type (site 04-3), Ely District.

Table 1. Table of Leader (Shrubs) and Height (Grasses and Forbs) Growth in Ely District for 1976, 1977, 1978, and 1979.

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 04-2 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 60 | | 100 | | 90 | | 57 | |
| 2. Arsp | 26 | | 20 | | 50 | | 25 | |
| 3. Atco | 50 | | 105 | | 90 | | 44 | |
| 4. Cela | 50 | | 160 | | 150 | | 77 | |
| 5. Save | 58 | | 63 | | 60 | | 54 | |
| GRASSES | | | | | | | | |
| 1. Orhy | 240 | | 190 | 165 | 200 | | 249 | |
| 2. Sihy | 255 | | 210 | 100 | 280 | | 172 | |
| Site 04-3 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 52 | | 98 | | 100 | | 100 | |
| 2. Chvi | 55 | | 100 | | 70 | | 67 | |
| GRASSES | | | | | | | | |
| 1. Agcr | 310 | | 455 | 150 | 330 | | 287 | |
| 2. Orhy | 300 | 75 | 375 | 160 | 400 | | 360 | |
| 3. Agsm | 270 | | 450 | 75 | 170 | | 150 | |
| FORBS | | | | | | | | |
| 1. Astra sp. | 55 | | 75 | | 75 | | 46 | 19 |
| 2. Phho | 51 | | 25 | | 20 | | 23 | |
| Site 04-5 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Arno | 25 | | 125 | | 35 | | 32 | |
| 2. Putr | 105 | | 60 | | 75 | | 74 | |

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 04-5 Con't. | | | | | | | | |
| GRASSES | | | | | | | | |
| 1. Posa | 210 | 25 | 150 | 50 | 310 | | 127 | |
| FORBS | | | | | | | | |
| 1. Pepa | 250 | | 340 | | 530 | | 495 | |
| Site 04-6 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Salix sp. | | | 70 | | 4 | | 70 | |
| GRASSES | | | | | | | | |
| 1. Popr | 300 | | 500 | | 260 | | 226 | |
| 2. Carex sp. | 170 | | 320 | | 210 | | 371 | |
| 3. Juba | 270 | | 380 | | 400 | | 454 | |
| 4. Agal | | | 800 | | 450 | | 559 | |
| FORBS | | | | | | | | |
| 1. Popa | 95 | | 200 | | 90 | | 170 | 40 |
| 2. Acla | 300 | | 550 | | 90 | | 195 | 16 |
| 3. Taof | 150 | | 150 | | 75 | | 71 | 15 |
| 4. Viad | 75 | | 90 | | 70 | | 101 | 30 |
| 5. Thmo | | | 450 | | 310 | | 410 | |
| Site 04-7 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Cele | 20 | | 10 | | 10 | | 25 | |
| 2. Ribes sp. | 52 | | 20 | | 7 | | 31 | |
| 3. Amal | 155 | | 30 | | 20 | | 45 | |
| 4. Sylo | 150 | | 185 | | 80 | | 47 | |
| 5. Bere | 20 | | 75 | | 100 | | 80 | LG* |
| 6. Artr | 50 | | 150 | | 100 | | 115 | |

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* Leaf Growth

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 04-7 Con't. | | | | | | | | |
| GRASSES | | | | | | | | |
| 1. Agsm | 210 | | 425 | 75 | 140 | | 145 | |
| 2. Pone | 360 | | 310 | | 300 | | --- | |
| 3. Orhy | 305 | | 380 | 150 | 300 | | 320 | |
| 4. Stco | | | 600 | 75 | 170 | | 407 | 160 |
| 5. Agsp | | | 500 | 75 | 200 | | 275 | |
| FORBS | | | | | | | | |
| 1. Meob | 178 | | 150 | | 150 | | 115 | |
| 2. Delph sp. | 210 | | 355 | | 125 | | 100 | |
| 3. Lupin sp. | | | 255 | | 150 | | 193 | |
| 4. Casti sp. | | | 355 | | 150 | | 260 | |
| 5. Lomat sp. | 76 | | 60 | | 30 | | 42 | 20 |
| Site 04-8 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Sylo | 105 | | 110 | | 30 | | 69 | |
| 2. Artr | 50 | | 80 | | 50 | | 47 | |
| 3. Amal | 15 | | 28 | | 30 | | 23 | |
| 4. Bere | 30 | | 77 | | 30 | | 111 | TG* |
| GRASSES | | | | | | | | |
| 1. Agsm | 155 | | 400 | | 150 | 75 | 96 | |
| 2. Pone | 305 | | 300 | | 75 | 150 | 68 | |
| FORBS | | | | | | | | |
| 1. Meob | 180 | | 110 | | 90 | | 146 | |
| 2. Peki | 250 | | 400 | | 100 | | 136 | |

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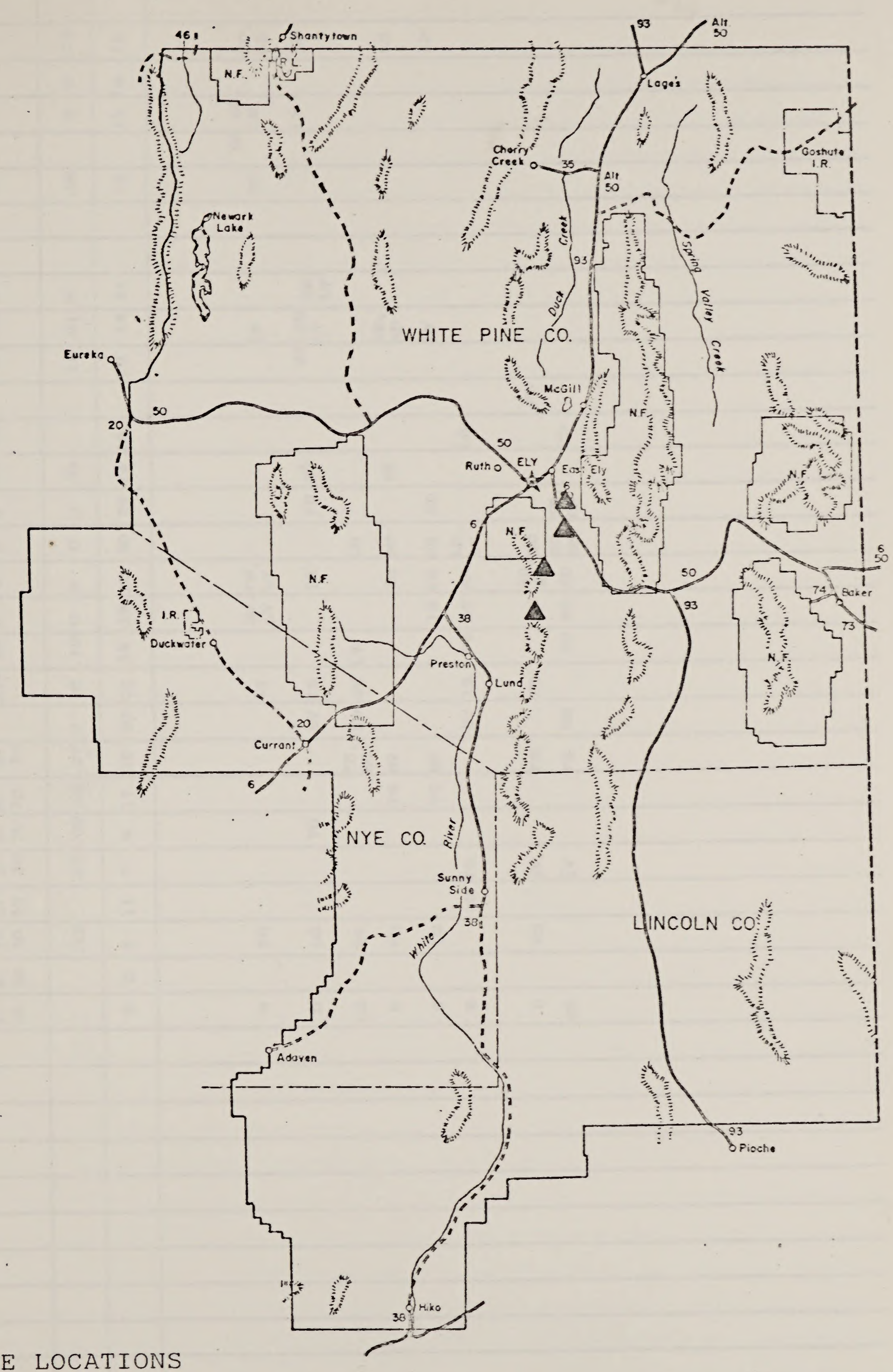
* Twig Growth

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 04-0 Con't. |  |  |  |  |  |  |  |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Carex sp. | 230 |  | 250 |  | 240 |  | 347 |  |
| 2. Juba | 330 |  | 350 |  | 400 |  | 441 |  |
| 3. Dist | 70 |  | 140 |  | 150 |  | 55 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Plma | 210 |  | 170 |  | 220 |  | 248 | 101 |



▲ SITE LOCATIONS
(Not all shown due
to closeness)

# ELY DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | 2-30 | S-30 | 7-30 | 3-30 | S-30 | S-30 | 6-30 | 6-30 | | 25+ | 8+ | D | D | D | D | 4+ | 15+ | | D | 10+ | D | | | D | | D | D | 3+ | | 7+ | | |
| Precip. (in) | | | | | | | | | | | | | | | .12 | | .43 | .09 | .02 | .27 | 0 | 0 | .10 | 0 | 0 | 0 | 0 | .91 | | | .16 | .91 | 0 | | | .05 | | 0 | 0 | .77 | | | | |
| S.T.-°C | | | | | | | | | | | | | 0 | 0 | 8 | 11 | 7 | 9 | 17 | 16 | 20 | 22 | 19 | 28 | 20 | 30 | 25 | 28 | 20 | | 19 | 18 | 24 | | | 12 | | 15 | 16 | 12 | | 10 | | |
| ELY 04-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | | | D | | TG | | | | | | | LY | | BV, LY | FG, LY | | | | | | | 1B | | | | BO | SR, SD, LD | | | SD, LD | | | | |
| Cela | | | | | | | | | | | | | D | | LG | | | TG | | | BV | FG | | | 1B | | FB | BO | | | | SR, SD, LY | SD, LY | | | | | LY | | LD | | | | |
| Arsp | | | | | | | | | | | | | LG | | BV | | | | | FB, BO | BO | SR | LY | | | LD | | | | | | | | | | | | | | | | | | |
| Save ♀ | | | | | | | | | | | | | D | | LG | | | | TG | BV | | | | | 1B | BO | | SR | | | | SR, SD | | | | | | | | LD | | | | |
| ♂ | | | | | | | | | | | | | D | | LG | | | | TG | BV | | | | 1B | FB | SR | SD | | | | | LY | | | | | | | | LD | | | | |
| Atco | | | | | | | | | | | | | D | | | LG | TG | | | | BV | 1B | FB | BO | SR | SD, LY | | | LD | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | | | D | | GS | | ½V | | | FS | | HO | | HS | SD, BD | BD | | | | PD | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | | | GS | | | | ½V | | | FS | HO | | DS | HS | SD | SD, BD | SD, PD | | PD | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | S-30 | 1-30 | MUD | 5-30 | 3-30 | 7-30 | 13-30 | 21+ | 3+ | 15+ | 24+ | D | 1-10. | 5+ | 15+ | | 8+ | 8+ | D | | | D | | D | D | 1+ | | 3.5+ | |
| Precip. (in) | | | | | | | | | | | | | | | | | MUD | .07 | .18 | .42 | 0 | 0 | .41 | 0 | 0 | 0 | .41 | 1.04 | .47 | | .47 | .37 | 0 | | | 0 | | 0 | 0 | 1.18 | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | 3 | 4 | MUD | 3 | 10 | 10 | 17 | 18 | 17 | 20 | 16 | 23 | 19 | 22 | 20 | | 16 | 15 | 19 | | | 12 | | 14 | 12 | 9 | | 6 | |
| ELY 04-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | | | | | TG | | | | | | | | | BV | | FG,<br>LY | | | | | | | | | | BO,<br>LY | | SR,<br>LD | | LD | | | |
| Chvi | | | | | | | | | | | | | | | D | LG | | TG | | | | | | | BV | FG,<br>1B | | FB | | | | BO | | | | SR<br>SD | | SD,<br>LY | | | | LD | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agcr | | | | | | | | | | | | | | | GS | | | ½V | | | FS | | HO | | An | DS | | DS,<br>BD | | | | SD,<br>BD | | | | | | PD | | | | | |
| Orhy | | | | | | | | | | | | | | | GS | | | ½V | | | FS | | | HO | DS,<br>SD | SD | BD | | | | | | | | | | | | | PD | | | |
| Agsm | | | | | | | | | | | | | | | GS | | | | ½V | | FS | | | HO | | An | DS | | | | SD | BD | | | | | | PD | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phho | | | | | | | | | | | | | | | D | GS | | | 1B | FB | BO | | SR | | DS | DS,<br>BD | BD | | | | | PD | | | | | | | | | | | |
| Astra sp. | | | | | | | | | | | | | | | GS | | | | FB | BO | | SR | | SR,<br>BD | DS,<br>BD | BD | PD | GS | | | | BD | | | | PD | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | |
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| SMD (From-To in cm) | | | | | | | | | | | | | | S-30 | S-30 | 4-30 | S-30 | S-30 | 7-30 | 2-30 | 13-30 | 22+ | 2+ | 16+ | D | D | D | 8 | 15+ | S+ | S+ | 10+ | D | | | D | D | D | S+ | | | 1.8 | |
| Precip. (in) | | | | | | | | | | | | | | | | 0 | .33 | | .21 | .25 | 0 | 0 | .38 | 0 | 0 | 0 | 0 | .94 | 0 | | .65 | 0 | 0 | | | .22 | 0 | 0 | 2. | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | 0 | 4 | 6 | 7 | 3 | 11 | 12 | 19 | 20 | 16 | 20 | 18 | 28 | 22 | 20 | 22 | | 14 | 16 | 19 | | | 14 | 13 | 13 | 10 | | | 10 | |
| ELY 04-5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arno | | | | | | | | | | | | | | D | TG | | | | | | | | | | | BV | LY | FG,<br>LY | | | | | 1B | | | BO,<br>LY | SD,<br>LD | | | | | | |
| Putr | | | | | | | | | | | | | | LG | | | TG | | | BV,<br>FG | FB | BO | SR | | | | | SD | | | | LY | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | | | | | D | GS | | ½V | | | | | | | | | | | BD | | | | | | | | | PD | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pepa | | | | | | | | | | | | | | D | GS | | | FS | | 1B | FB | | SR | | DS | | DS,<br>BD | BD | | | | | PD | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
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| SMD (From-To in cm) | | | | | | | | | | | | | | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S 30 | S | S | S | S | S | S | S | S | | | S | S | S | | | S | | S | S | S | | S | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | | | | | | | | | | 0 | | | | | | |
| S.T.-°C | | | | | | | | | | | | | | 6 | 7 | 6 | 9 | 7 | 12 | 12 | 16 | 18 | 11 | 17 | 14 | 16 | 15 | 16 | 16 | | 14 | 14 | 15 | | | 12 | | 11 | 11 | 11 | | 10 | | |
| ELY 04-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salix sp. | | | | | | | | | | | | | | D | | | LG | | TG | BV | | | | FG | | | | | | | | | LY | | | | | LD | | | | | | |
| Riar | | | | | | | | | | | | | | D | LG | | TG | | BV | FB | BO | SR | | | | | | SD, LY | LY | | | | | | | LD | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carex sp. | | | | | | | | | | | | | | GS | | | ½V | | | HO | An | | DS | HS | SD | | SD, BD | | BD | | | | | | | | | PD | | | | | | |
| Juba | | | | | | | | | | | | | | GS | | | ½V | | | | FS | | HO | | DS | SD | BD | | | | | | | | | | | PD | | | | | | |
| Agal | | | | | | | | | | | | | | GS | | | ½V | | | | FS | | HO | | | An | DS | | | BD | | | | | | | | PD | | | | | | |
| Popr | | | | | | | | | | | | | | GS | | | ½V | | | FS | HO | An | DS | | gr. | | | | HS | BD | | | | | | PD | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Acla | | | | | | | | | | | | | | GS | | | | | | | | | | | | | | | | | | GS | | | | GS, BD | | BD | | | | | | |
| Taof | | | | | | | | | | | | | | D | GS | | | FS | 1B | FB | BO | SR | DS | | BD | | | | | | | GS | BD | | | | | PD | | | | | | |
| Thmo | | | | | | | | | | | | | | D | | GS | FS | | | FB | BO | | SR | | DS | | BD | | | | | | PD | | | | | | | | | | | |
| Viad | | | | | | | | | | | | | | GS | | | | | 1B | FB | BO | | SR | | | DS, BD | BD | GS | | | | | | | | BD | | PD | | | | | | |
| Popa | | | | | | | | | | | | | | D | | GS | | | | FS | | 1B | FB | BO | DS | | | BD | | GS | | | | | | BD | | PD | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | 3-30 | 1-30 | 4-30 | 9-30 | S+ | 10+ | 26+ | D+ | S-2. | 4+ | 4+ | | S | 11+ | D | | | D | | D | D | S+ | | Sn | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | .20 | .45 | 0 | 0 | 0 | .08 | 1.28 | 0 | | 1.28 | 0 | 0 | | | .13 | | 0 | 0 | 1.52 | | | | |
| S.T.-°C | | | | | | | | | | | | | | | | | | | 10 | 9 | 16 | 18 | 10 | 16 | 16 | 17 | 19 | 16 | 18 | | 14 | 12 | 17 | | | 12 | | 16 | 14 | 10 | | 8 | | |
| ELY 04-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cele | | | | | | | | | | | | | | | | | | | TG | 1B, FB | BO | SR | | | SD | SD, LY | | | | | | | | | | | | SD, LD | | | | | | |
| | | | | | | | S | N | O | W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ribes sp. | | | | | | | | | | | | | | | | | | | TG | BV, 1B | BO | SR | | | SR, SD | SD | | | | | | SD, LY | | | | LD | | | | | | | | |
| | | | | | | | M | U | D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | | | | | | | | | TG | | FG | | | BV | | FG, LY | | | | | | FG, LD | 1B, LD | | | BO, LD | | SR,SD, LD | | SD, LD | | LD | | |
| Sylo | | | | | | | | | | | | | | | | | | | TG | BV | | | FG | | SR, SD | | | SD | | | | LY | | | | | | | | LD | | | | |
| Amal | | | | | | | | | | | | | | | | | | | LG | TG, BV | 1B | FB | BO | SR | SD | | | | | | | LY | | | | | | | | LD | | | | |
| Bere | | | | | | | | | | | | | | | | | | | TG | 1B, FB | BO | SR | | | | SD, LY | | SD, LG | | | LG | | | | | LY | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | | | | | | | | | ½V | FS | | HO | | | DS | HS | SD | | | | BD | | | | | | | | | PD | | | | |
| Pone | | | | | | | | | | | | | | | | | | | ½V | | FS | | | HO | fungus | | BD | | | | | | | | | | | | | PD | | | | |
| Agsp | | | | | | | | | | | | | | | | | | | GS | ½V | FS | | | HO | An | DS | HS | | | | SD | SD, BD | | | | | | BD | PD | | | | | |
| Stco | | | | | | | | | | | | | | | | | | | ½V | FS | | HO | | | HS, SD | SD | BD | BD, GS | BD | | | | | | | | | | | | | PD | | |
| Agsm | | | | | | | | | | | | | | | | | | | | FS | | | | | | | BD | | | | | | | | | | | PD | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lupin sp. | | | | | | | | | | | | | | | | | | | FS | | | FB | BO | | SR | DS | BD | | | | | PD | | | | | | | | | | | | |
| Casti sp. | | | | | | | | | | | | | | | | | | | FS | | 1B | BO | SR | BD | PD | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
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| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ELY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 04-7 Cont'd | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Meob | | | | | | | | | | | | | | | | | | | FB | | BO | SR | DS | BD | | PD | | | | | | | | | | | | | | | | | | |
| Delph sp. | | | | | | | | | | | | | | | | | | | FS | | | BD | PD | | | | | | | | | | | | | | | | | | | | | |
| Lomat sp. | | | | | | | | | | | | | | | | | | | | 1B | | | BO | | SR,<br>DS | DS,<br>BD | BD | GS | | | | GS,<br>PD | DS | | | BD | | PD | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
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| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | | 1-30 | 5+ | S+ | 4+ | 17+ | 26+ | S-9. | S+ | 3+ | | 4+ | 20+ | D | | | D | | D | D | S+ | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | .10 | 1.55 | 0 | | 1.26 | 0 | 0 | | | 0 | | 0 | 0 | 1.87 | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | | | 11 | 18 | 10 | 20 | 15 | 23 | 18 | 18 | 12 | | 13 | 11 | 16 | | | 10 | | 12 | 11 | 6 | | | | |
| ELY 04-8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | | | | | | | | | | | TG | | | | BV | FG | | | | | | FG, LY | 1B, LY | | | BO, LY | | SR, LY | | SD, LY | | | | |
| Sylo | | | | | | | | | | | | | | | | | | | | | TG | | | | SR | | SD | | | | LY | | | | | | | LD | | | | | | |
| Amal | | | | | | | | | | | | | | | | | | | | | TG | | BV | 1B | BO | SR | | | | | | SR, LY | SD, LY | | | LY | | LD | | | | | | |
| Bere | | | | | | | | | | | | | | | | | | | | | TG | | | | | BV | | | LY | | | | | | | | TG/LY | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agsm | | | | | | | | | | | | | | | | | | | | | ½V | | | | | | | | BD | | | | | | | | | | | | | | | |
| Pone | | | | | | | | | | | | | | | | | | | | | ½V | | | | | | | | BD | | | | | | | | | PD | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Meob | | | | | | | | | | | | | | | | | | | | | FB | | BO | SR | DS, BD | PD | | | | | | | | | | | | | | | | | | |
| Peki | | | | | | | | | | | | | | | | | | | | | GS | | | FS | 1B | | BO, SR | SR | | | DS | BD | | | | PD | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | |
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| SMD (From-To in cm) | | | | | | | | | | | | | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S-30 | S | S | S | S | S | S | S | S | S | S | | S | S | S | | | S | | S | S | S | | S | |
| Precip. (in) | | | | | | | | | | | | | | | .19 | | .36 | .14 | .19 | .53 | | | .95 | | | | | 1.3 | | | .2 | 0 | 0 | | | 0 | | 0 | 0 | 106 | | | |
| S.T.-°C | | | | | | | | | | | | | 0 | 0 | 7 | 13 | 9 | 7 | 13 | 14 | 18 | 18 | 16 | 20 | 16 | 18 | 20 | 19 | 20 | | 18 | 16 | 15 | | | 13 | | 13 | 11 | 10 | | 8 | |
| ELY 04-9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Juba | | | | | | | | | | | | | GS | | | | $\frac{1}{2}$V | | | | FS | HO | | | DS | HS | SD | | | | | BD | | | | | | | | | | | |
| Dist | | | | | | | | | | | | | GS | | | | | $\frac{1}{2}$V | | FS | HO | | | An | DS | | | HS | | | SD | SD,<br>BD | | | | BD | | | | | | | |
| Carex sp. | | | | | | | | | | | | | D | | GS | | $\frac{1}{2}$V | | | HO | An | DS | | HS | SD | | | | | | | BD | | | | | | | | | | PD | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Plma | | | | | | | | | | | | | D | | GS | | | | FS | 1B | | FB | BO | SR | | FS | | FS,<br>DS | | | | FS,<br>BD | BD<br>BD | | | | | | | PD | | | |
| Iris sp. | | | | | | | | | | | | | | | | GS | | | | FS | | FB | BO | SR | | DS | | BD | | | | | | | | | | | | | | | |

BATTLE
MOUNTAIN

CARROLL
SUMMIT

# LAS VEGAS

The final year of phenology data further establishes a general description of species development. Results from 1979 offered no surprises. For spiny hopsage (Grayia spinosa), the 1979 data fits well within the pattern described the previous three years (Figure 1). Big galleta (Hilaria rigida) developed much slower the first year of the study (Figure 2), while the following three years showed a close phenological development. This is a good example of the problem inherent in relying on a single year of phenological data.

Galleta (Hilaria jamesii) showed similar phenology among the four years except for drying and regrowth. This species is a warm season grass and varies considerably in its maturation and regrowth depending on late summer rains and associated warm weather (Figure 3).

Even though development to $\frac{1}{2}$ vegetative growth and the appearance of flower stalks varies up to several weeks depending upon year and species, the period of seed dissemination is remarkably consistent in the desert grasses: Indian ricegrass (Oryzopsis hymenoides), galleta, and big galleta (Figure 4). This may well be an important consideration in setting grazing use for these species.

Indian ricegrass seems to indicate that late season growth was dependent upon soil moisture within a few inches of the surface of the soil (Figure 5). Height growth of this species is strongly regulated by the availability of soil moisture (Figure 6).

Leader growth of the desert shrub bur-sage (Ambrosia dumosa) is influenced by the adequate early season (April) soil moisture (Figure 7). The initiation of growth, full bloom and the time when the plants are dry varies considerably from year to year in the forb desert globemallow (Sphaeralcea ambigua; Figure 8). For this species the 1977 growing season was earlier than the other three years of the study.

The onset and duration of leaf and twig growth in the desert shrubs cliffrose (Cowania stansburiana), big sagebrush (Artemesia tridentata) and littleleaf krameria (Krameria parvifolia) show great variability among years (Figure 9). Of particular interest is the length of time of leaf growth prior to the onset of twig growth. Leaf growth of littleleaf krameria lasts up to 8 weeks before the start of twig growth, while for big sagebrush this period is very short, usually lasting only one week. Cliffrose appears to be intermediate in this regard.

Leader and height growth for the various species on these Lincoln County sites shows reasonable consistency from year to year (Table 1). There are no strong trends.

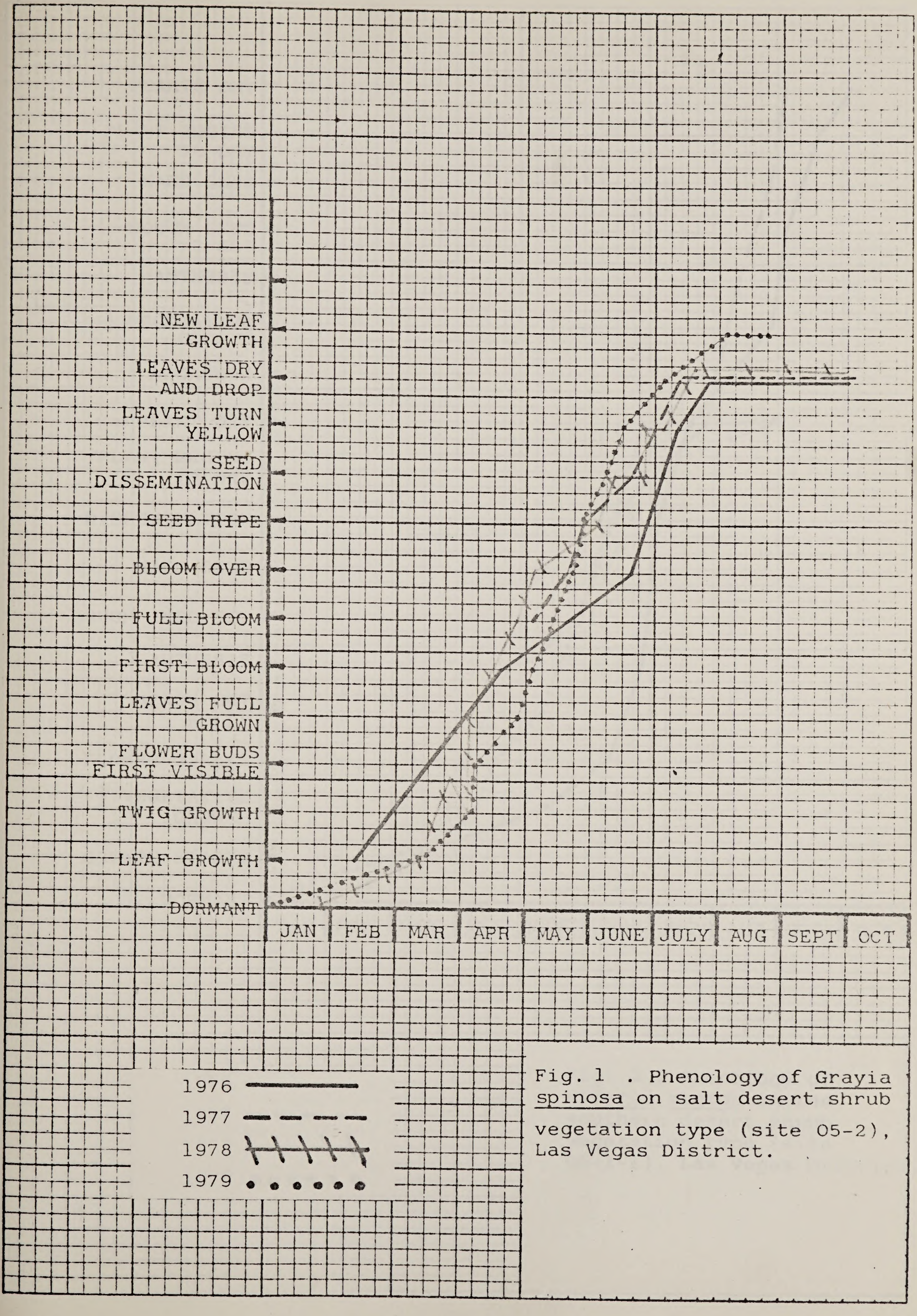


Fig. 1 . Phenology of Grayia spinosa on salt desert shrub vegetation type (site 05-2), Las Vegas District.

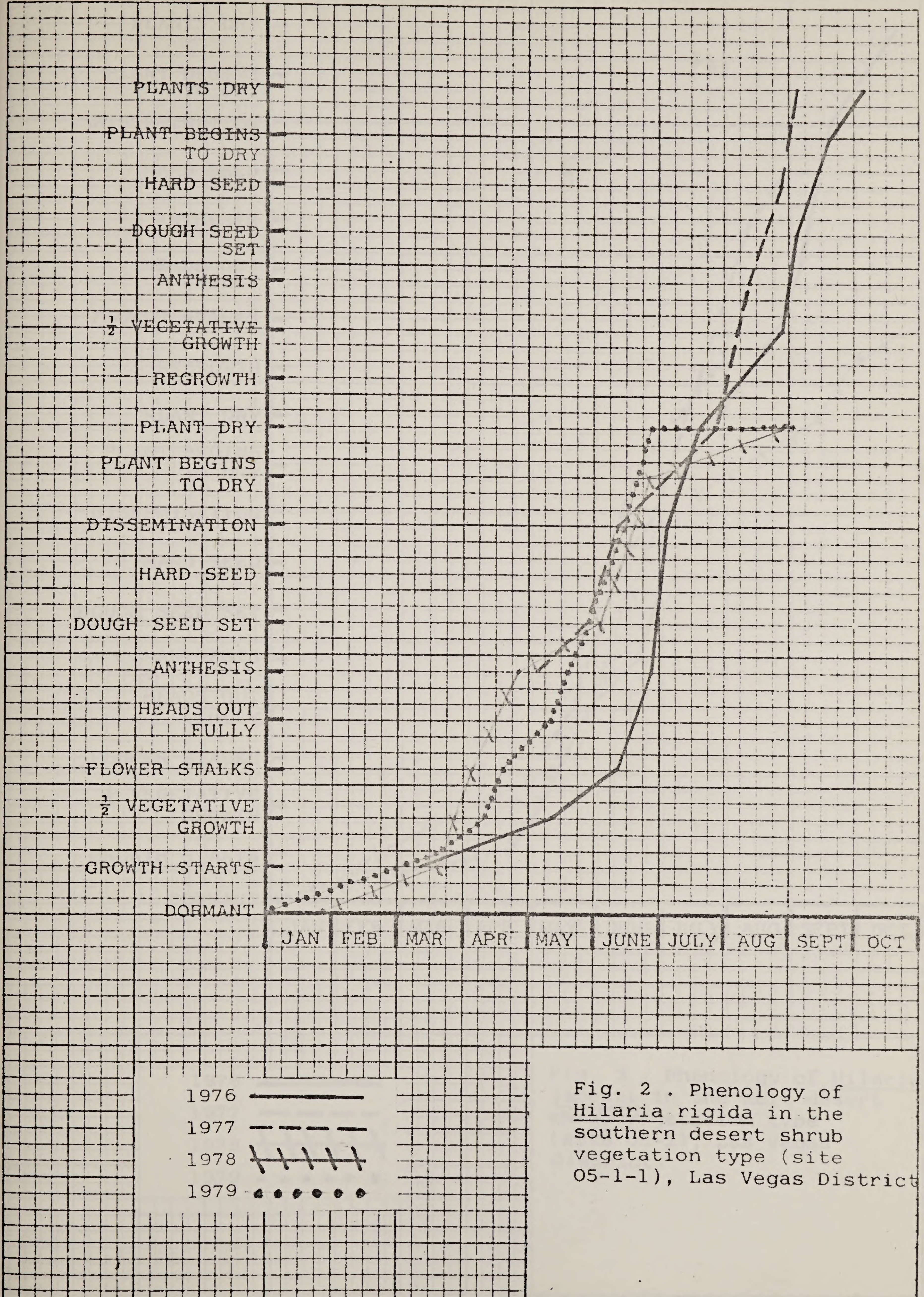


Fig. 2 . Phenology of *Hilaria rigida* in the southern desert shrub vegetation type (site 05-1-1), Las Vegas District.

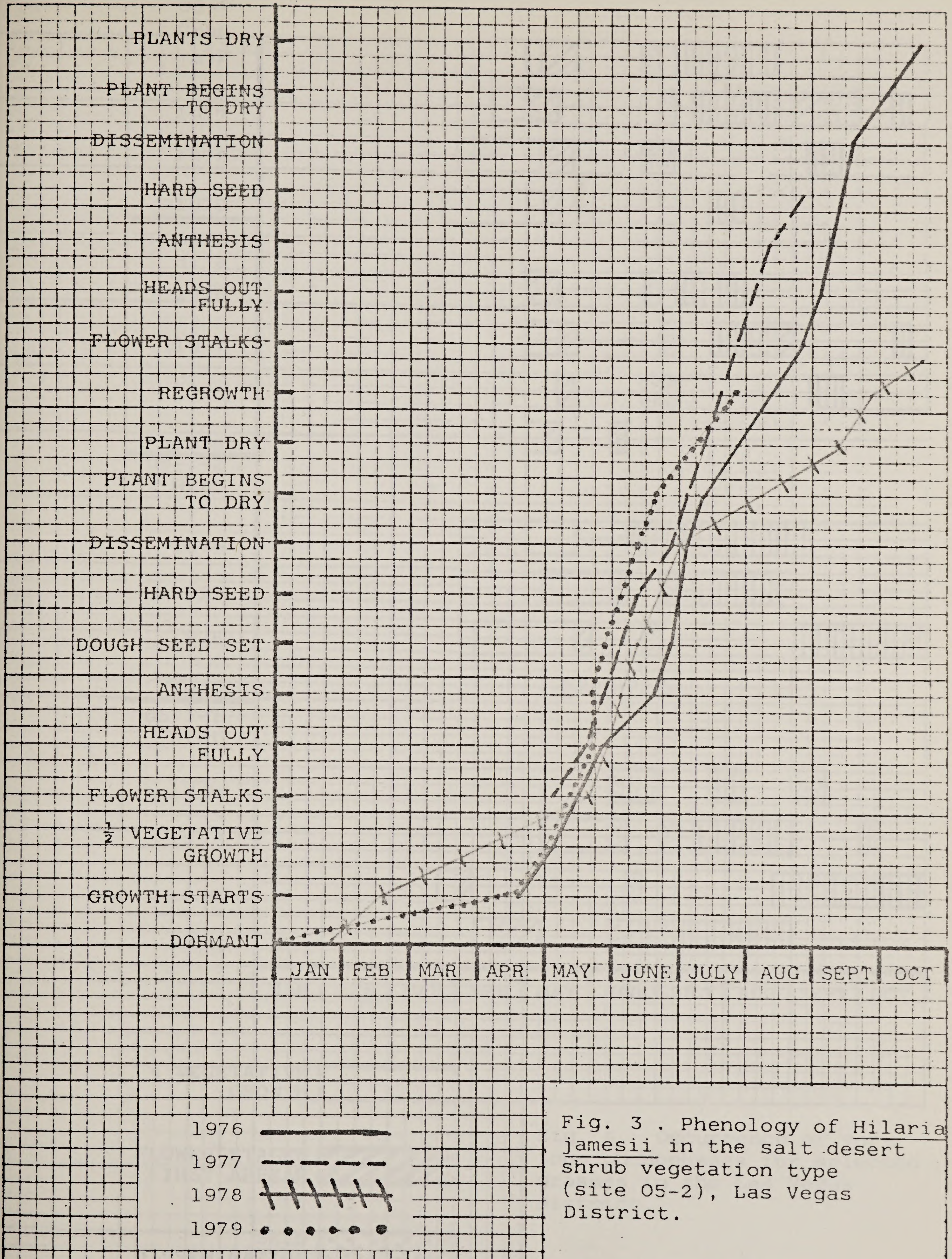


Fig. 3 . Phenology of Hilaria jamesii in the salt desert shrub vegetation type (site 05-2), Las Vegas District.

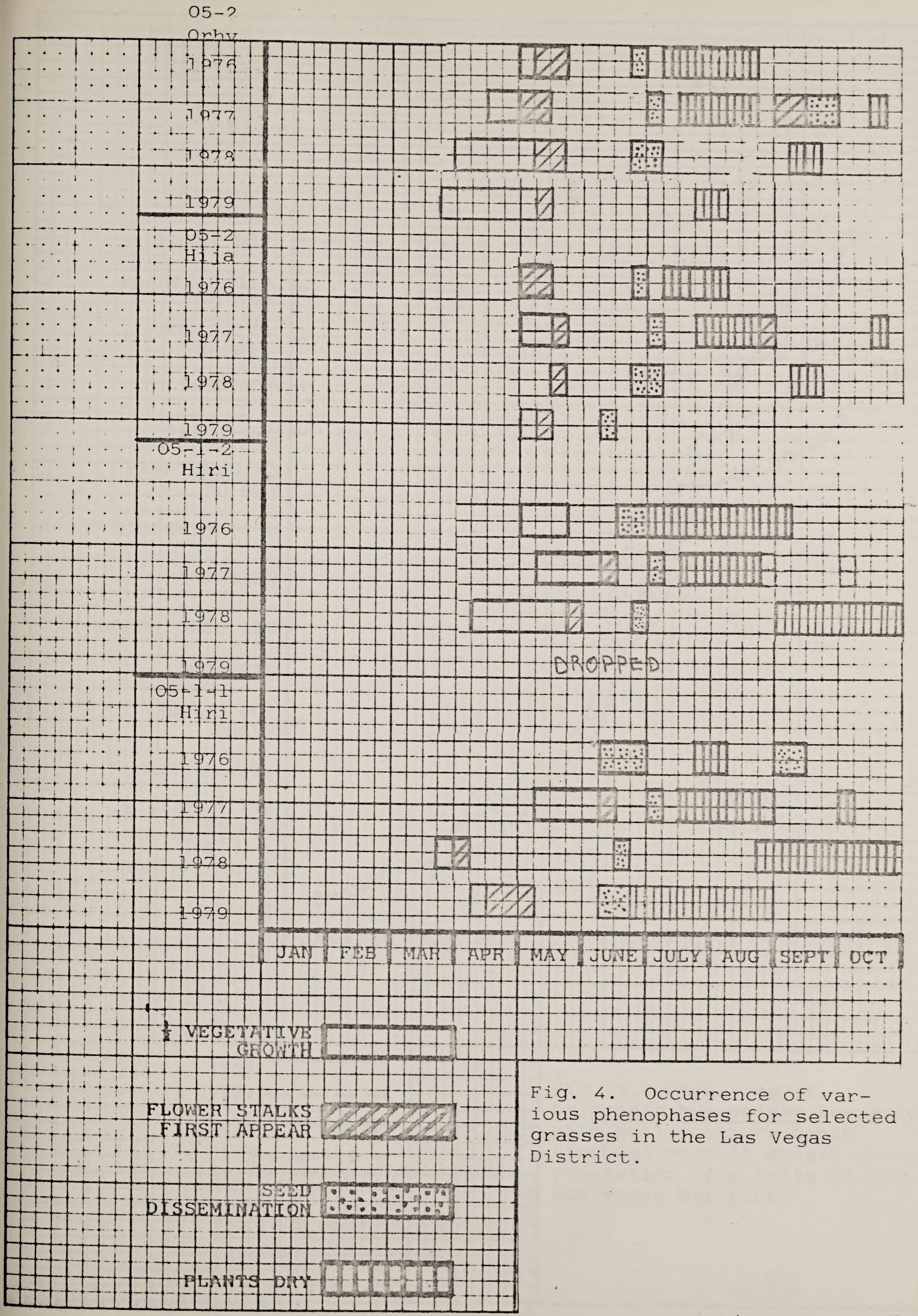


Fig. 4. Occurrence of various phenophases for selected grasses in the Las Vegas District.

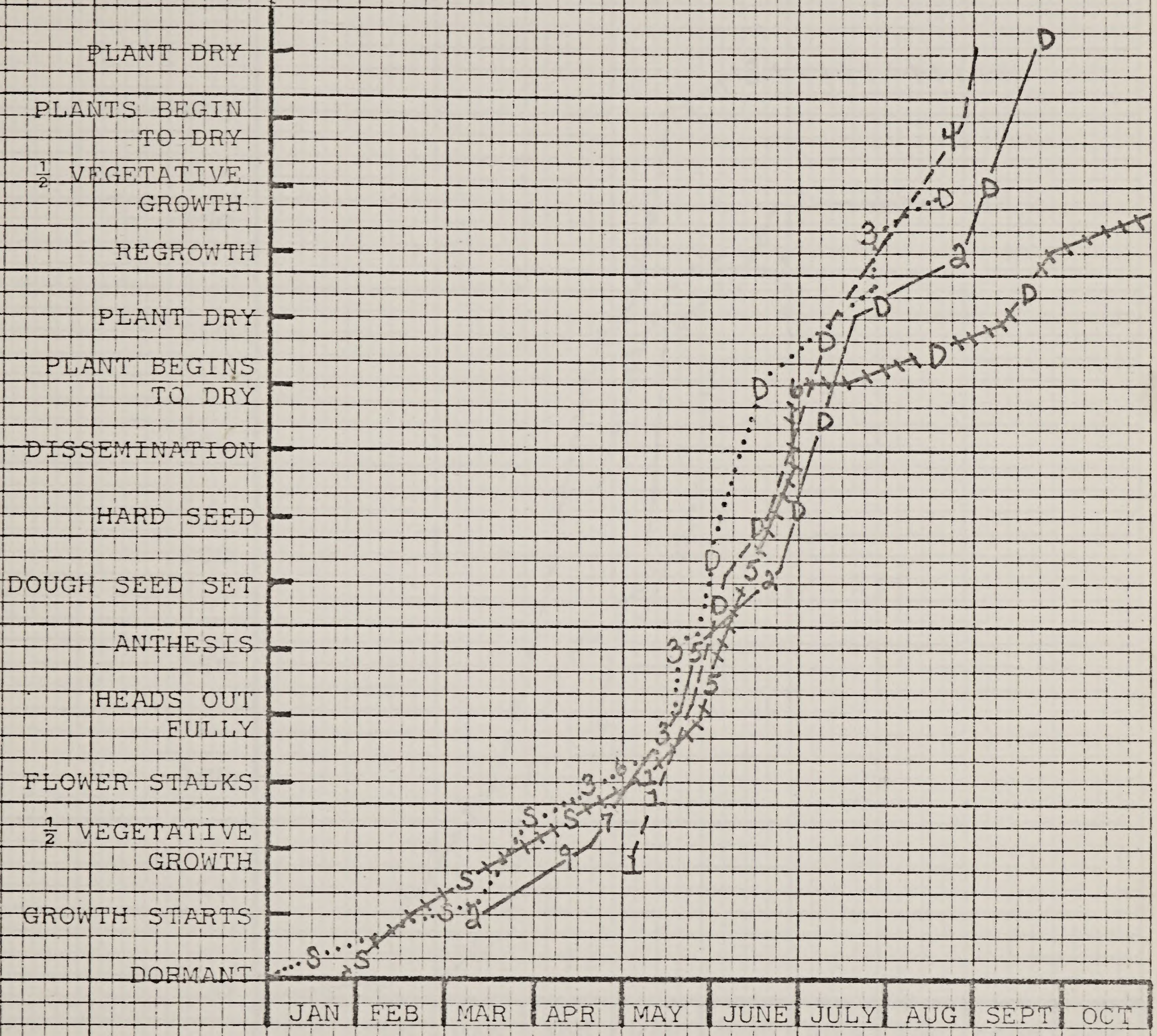


Fig. 5. Phenology of Oryzopsis hymenoides compared with soil moisture depth (inches) on salt desert shrub vegetation type (site 05-2), Las Vegas District.

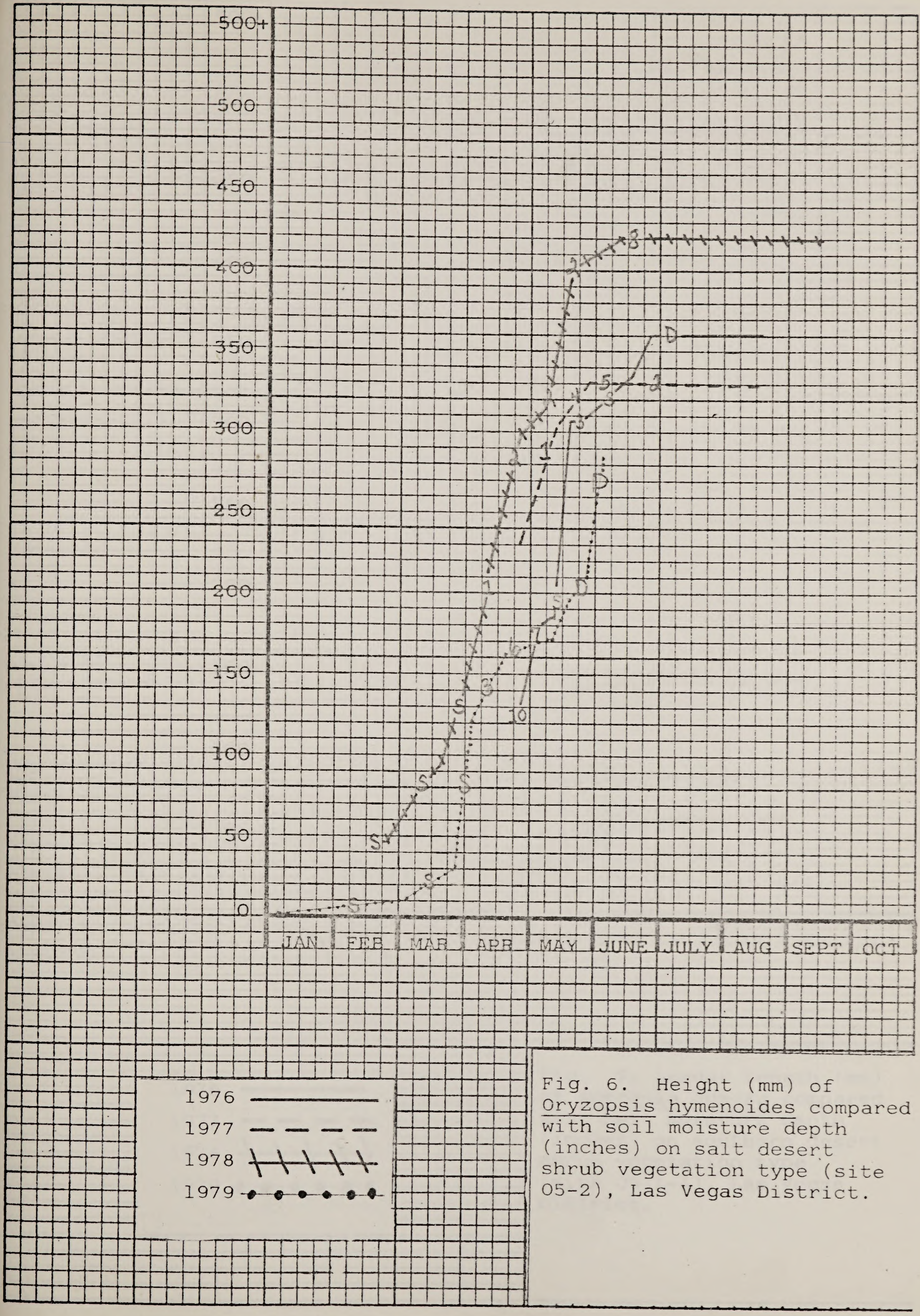


Fig. 6. Height (mm) of Oryzopsis hymenoides compared with soil moisture depth (inches) on salt desert shrub vegetation type (site 05-2), Las Vegas District.

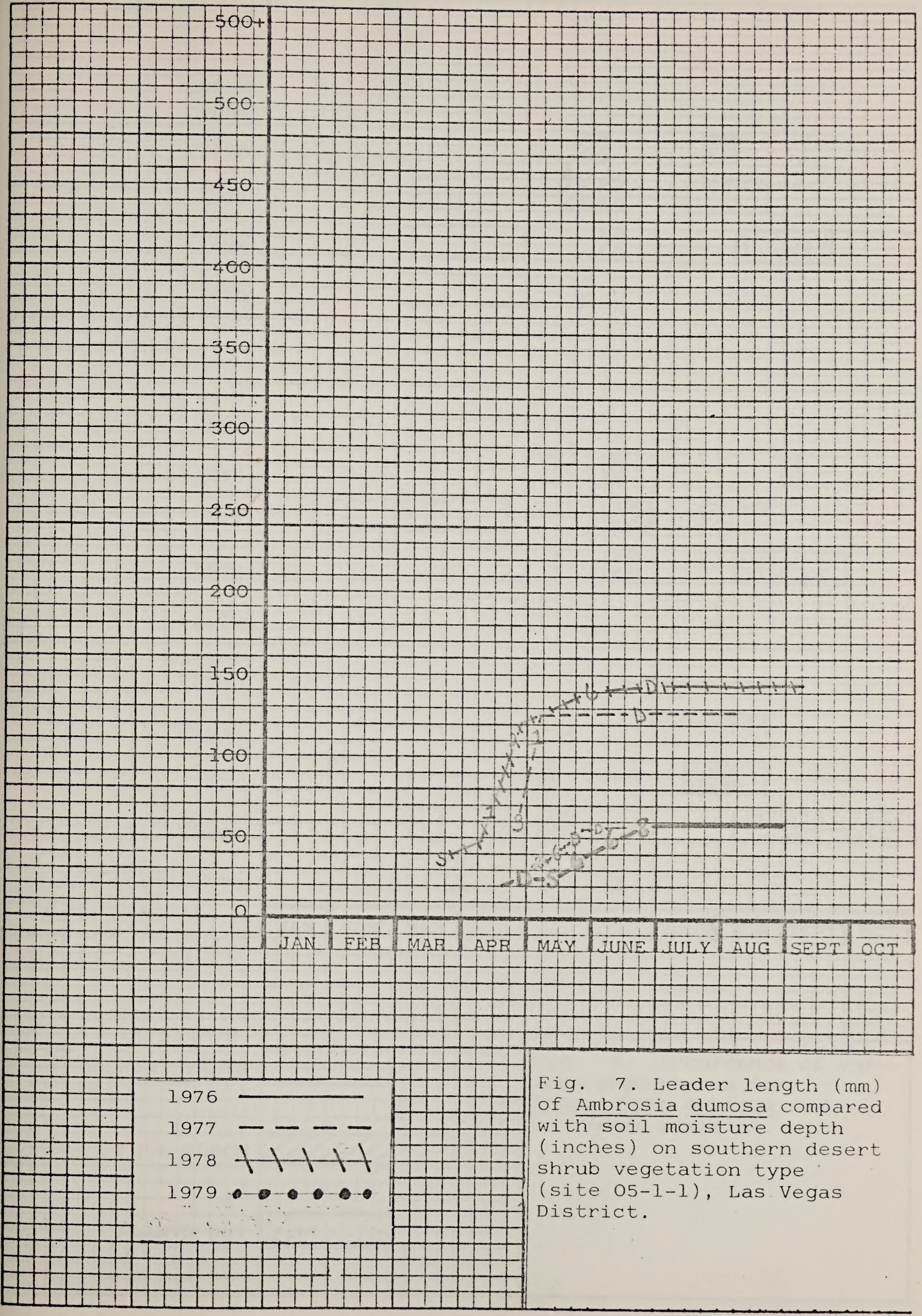


Fig. 7. Leader length (mm) of Ambrosia dumosa compared with soil moisture depth (inches) on southern desert shrub vegetation type (site 05-1-1), Las Vegas District.

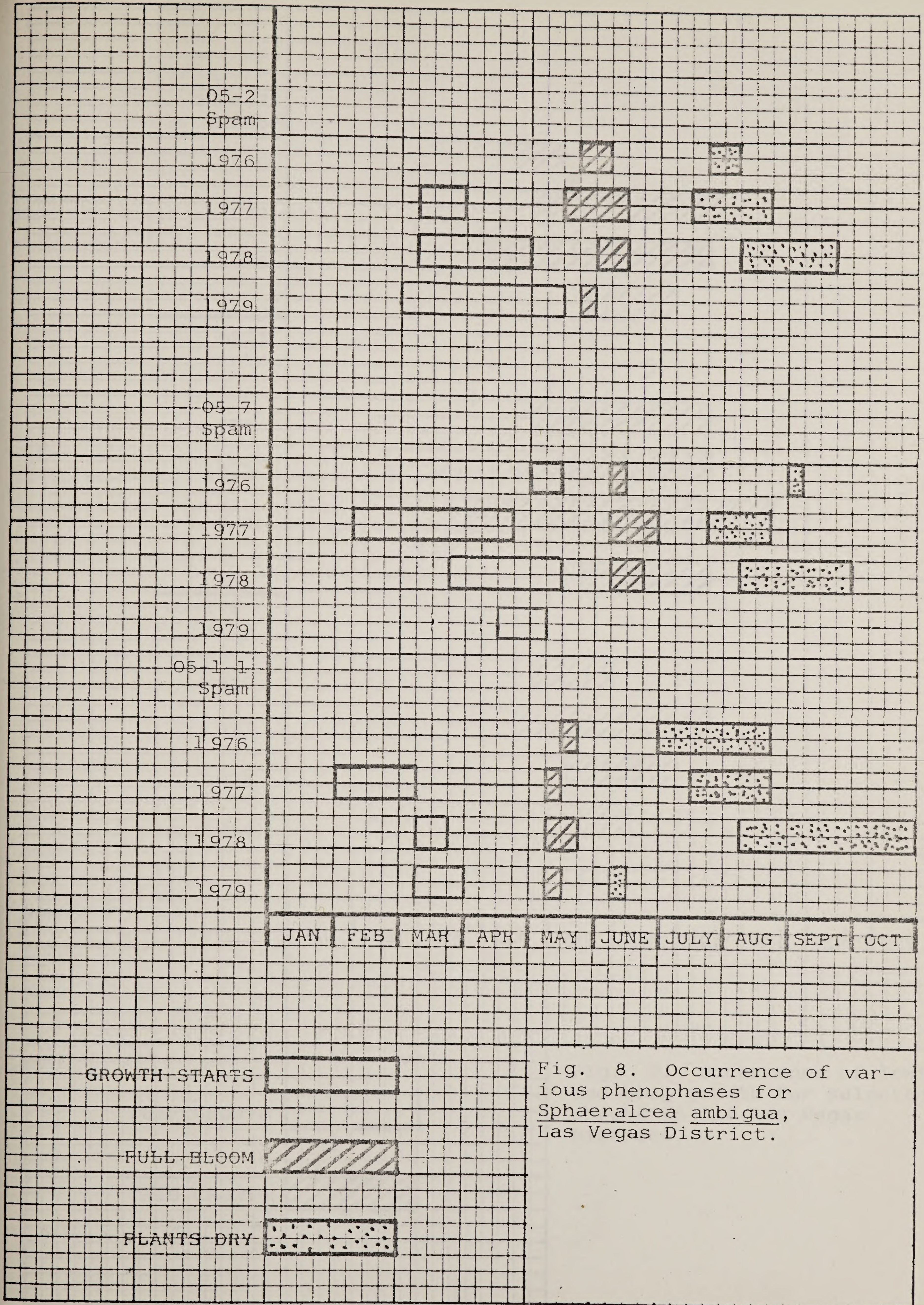


Fig. 8. Occurrence of various phenophases for *Sphaeralcea ambigua*, Las Vegas District.

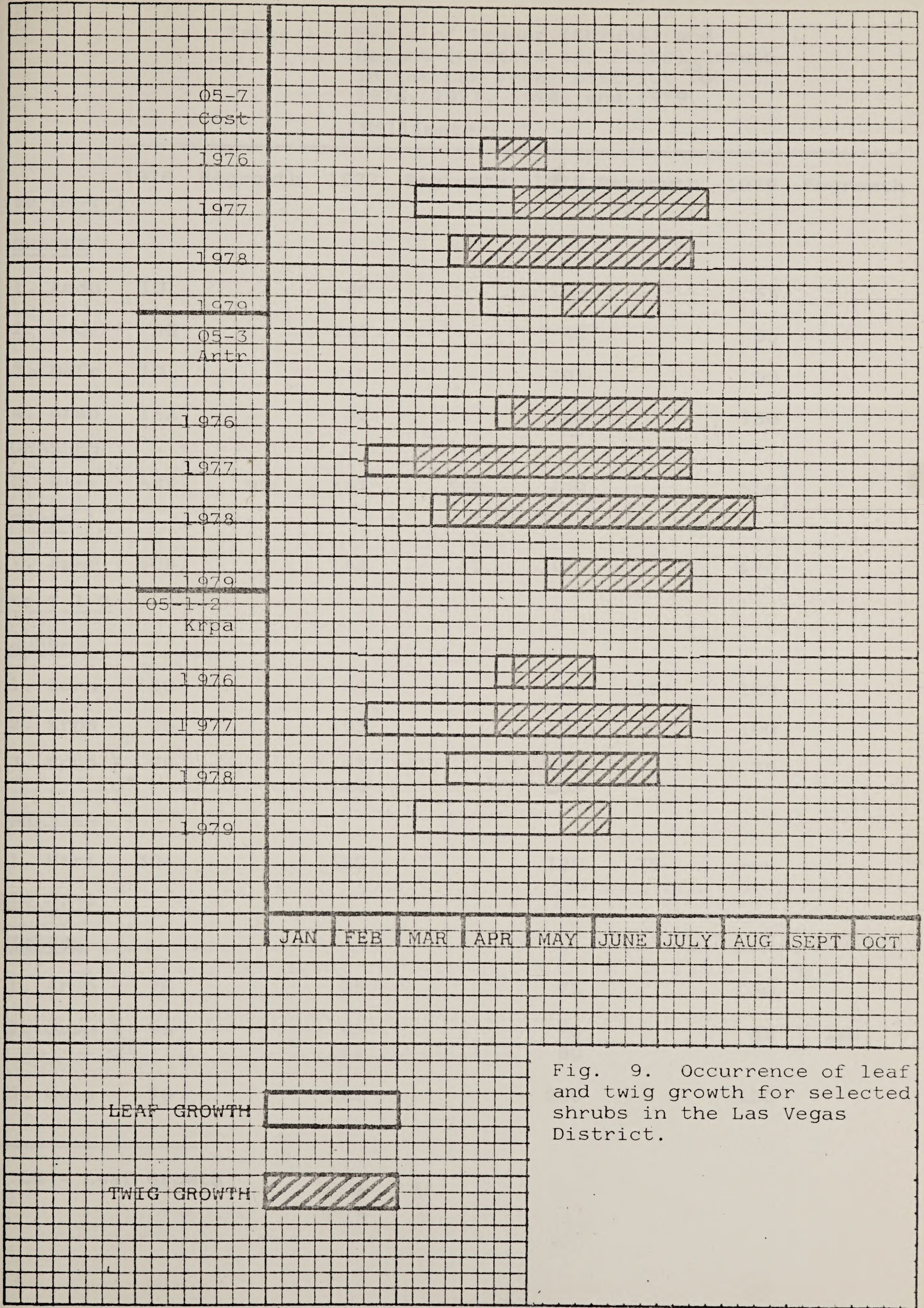


Fig. 9. Occurrence of leaf and twig growth for selected shrubs in the Las Vegas District.

Table 1. Table of Leader (Shrubs) and Height (Grasses and Forbs) Growth in the Las Vegas District for 1976, 1977, 1978, and 1979.

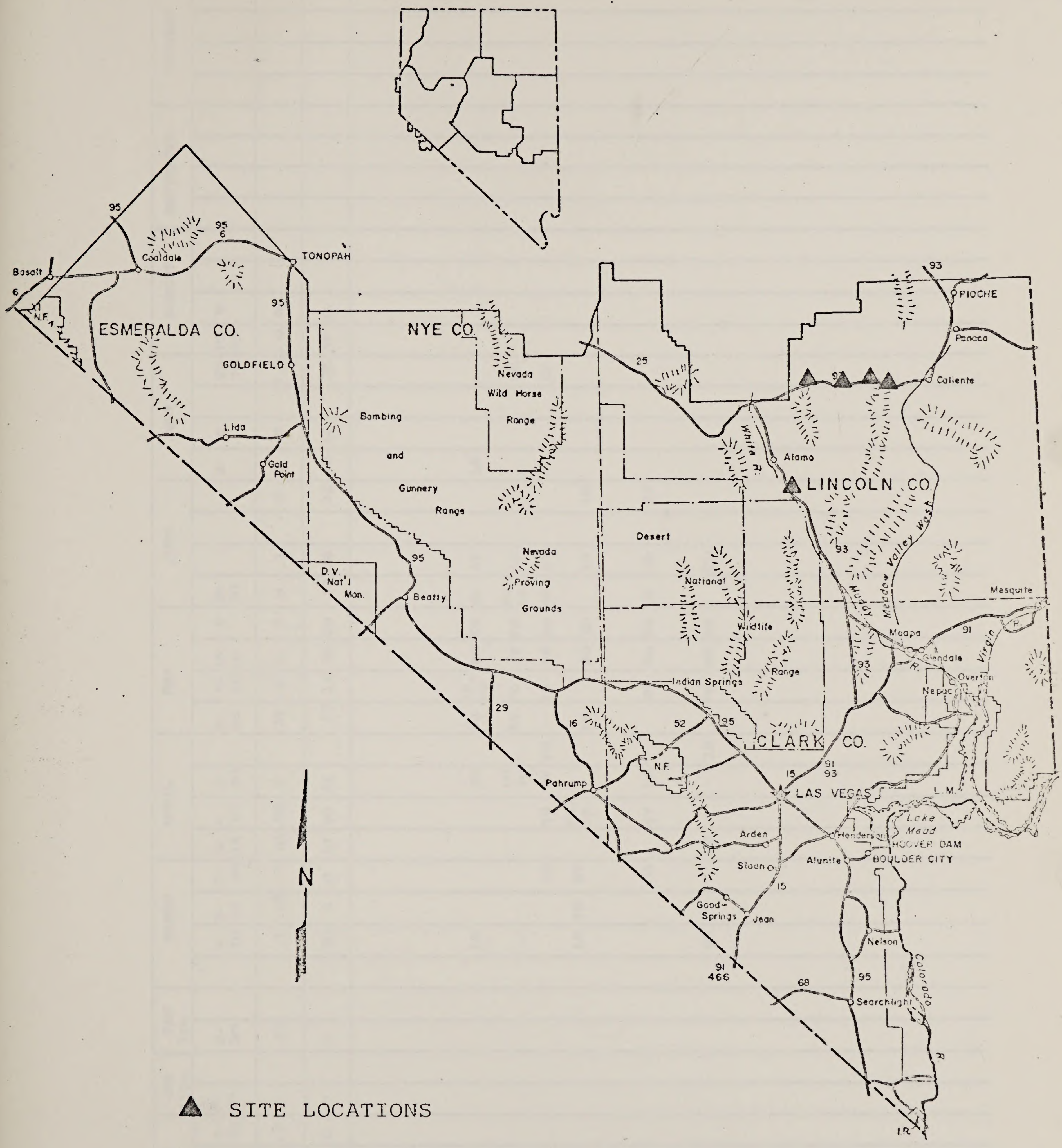
Millimeters

| | | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
|---|---|---|---|---|---|---|---|---|---|
| Site 05-1-1 | | | | | | | | | |
| SHRUBS | | | | | | | | | |
| 1. Amdu | | 101 | | 60 | | 143 | | 55 | |
| 2. Ladi | | 50 | | 101 | | 44 | | 65 | |
| 3. Dafr | | 101 | | 140 | | 205 | | 90 | |
| 4. Grsp | | 152 | | 32 | | 140 | | 150 | |
| GRASSES | | | | | | | | | |
| 1. Hiri | | 355 | 304 | 461 | 350 | 409 | | 300 | |
| FORBS | | | | | | | | | |
| 1. Spam | | 508 | | 182 | 85 | 485 | | 370 | |
| Site 5-1-2 | | | | | | | | | |
| SHRUBS | | | | | | | | | |
| 1. Cora | | 50 | | 59 | | 64 | LG* | 100 | |
| 2. Krpa | | 25 | | 193 | | 105 | 60 | 100 | |
| 3. Epne | ♀ | 76 | | 63 | | 190 | | 35 | |
| | ♂ | | | 140 | | 205 | | | |
| GRASSES | | | | | | | | | |
| 1. Hiri | | 304 | | 420 | | 120 | 75 | --- | |
| Site 05-2 | | | | | | | | | |
| SHRUBS | | | | | | | | | |
| 1. Arsp | | 76 | | 35 | | 75 | | 50 | |
| 2. Grsp | ♀ | 76 | | 91 | | 70 | | 88 | LG* |
| | ♂ | | | 141 | | 80 | | | |
| 3. Cela | | 76 | | 121 | | 200 | | 120 | |

---

* LG - Leaf Growth

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 05-2 Con't. |  |  |  |  |  |  |  |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Hija | 304 |  | 307 | 200 | 160 | 100 | 210 | 110 |
| 2. Orhy | 330 |  | 363 | 190 | 420 | 100 | 285 | 140 |
| 3. Sihy | 228 |  | 284 | 180 | 355 | 70 | 250 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Spam | 406 |  | 505 | 330 | 470 | 90 | 390 | 50 |
| Site 05-3 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Artr | 101 |  | 223 |  | 233 |  | 75 |  |
| 2. Chvi |  |  | 149 |  | 204 |  | 80 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Orhy | 203 |  | 302 | 260 | 300 | 130 | 320 | 150 |
| 2. Hija | 177 |  | 421 | 275 | 160 | 195 | 310 | 110 |
| 3. Sihy | 228 |  | 308 | 250 | 305 | 110 | 290 | 50 |
| Site 05-7 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Cost | 50 |  | 87 |  | 101 |  | 65 |  |
| 2. Epvi | 76 |  | ♀ 35<br>♂ 48 |  | 165 |  | 30 |  |
| 3. Artr | 76 |  | 170 |  | 202 |  | 90 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Hiri | 203 |  | 245 | 330 | 200 | 135 | 210 | 120 |
| 2. Bogr | 203 |  | 169 | 225 | 84 | 93 | 115 | 100 |
| 3. Sihy | 254 |  | 247 | 146 | 236 | 70 | 285 | 210 |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Spam | 254 |  | 281 | 202 | 235 | 50 | 150 | 100 |



# LAS VEGAS DISTRICT

| SYMBOL 1979 | DECEMBER | | | | JAN 11th | | FEB 7th | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | 2-25 | | 2-30 | 5-25 | | S-30 | | | 4-20 | S-30 | S-30 | 5-18 | 4-30 | 5-30 | | S-25 | 5-20 | 15-30 | D | 20-30 | | | | D | D | | 20-30 | 10-30 | D | | | | | | | | | | | | | | |
| Precip. (in) | | .25 | | .30 | 0 | | .45 | | | .1 | .25 | .75 | .65 | .08 | 0 | | .35 | .2 | 0 | 0 | 0 | .1 | | 0 | 0 | 0 | | 1.25 | 0 | 0 | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | 0 | | 0 | 0 | | 0 | | | 20 | 9 | 0 | 21 | 20 | 21 | | 17 | 14 | 30 | 29 | 30 | 38 | | 32 | 40 | 34 | | 36 | 38 | 34 | | | | | | | | | | | | | | |
| LAS VEGAS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-5-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amdu | | D | | | | | | | | LG | | | | | BV | | FG | 1B,<br>TG | BO | SR | SD | LY | | | LD | | | | | | | | | | | | | | | | | | | |
| Ladi | | D | | | | | | | | | | | | | LG,<br>TG | | BV | FG | 1B | FB | BO,<br>SR | LY | | | | | | LD | | | | | | | | | | | | | | | | |
| Daft | | D | | | | | | | | | | LG | | TG | BV | FG | | 1B | FB | BO | SR | LY | | | | | | LD | | | | | | | | | | | | | | | | |
| Grsp | | D | | | | | | | | LG | TG | BV | | FG,<br>1B | | | FB | | BO | SD | | LY | | LD | | | | | | | | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hiri | | D | | | | | | | | | | GS | | ½V | FS | | | HO | An | DS | HS | SD | | PD | | | | | | | | | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spam | | D | | | | | | | | GS | | | FS | | | 1B | | FB | BO | SR | | PD | | | | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | DECEMBER | | | | JAN | | FEB | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 11th | | 7th | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SMD (From-To in cm) | | 2-30 | | 1-25 | S-20 | | 5-30 | | | 2-25 | 2-25 | S-30 | 2-15 | 2-30 | 7-30 | | 10-20 | 8-20 | D | D | 15-30 | D | | D | D | D | | 10+ | 20+ | D | | | | | | | | | | | | | | |
| Precip. (in) | | .25 | | .35 | .20 | | .90 | | | .2 | .15 | -- | .90 | .05 | 0 | | .2 | .3 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | | 1.15 | 0 | 0 | | | | | | | | | | | | | | |
| S.T.-°C | | 0 | | 6 | 0 | | 0 | | | 16 | 10 | 0 | 14 | 23 | 26 | | 20 | 22 | 35 | 36 | | 40 | | 43 | 39 | 26 | | 30 | 32 | 32 | | | | | | | | | | | | | | |
| LAS VEGAS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-1-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cora | | D | | | | | | | | | | | | | LG | | TG,<br>BV | 1B | FB | BO | SR | LY | | LD | | | | | | | | | | | | | | | | | | | | |
| Krpa | | LD | | D | | | | | | LG | | | | | | | | | TG | | | FG | | | | | | LY | | | | | | | | | | | | | | | | |
| Epne | | D | | | | | | | | LG | | | | | TG | BV | | | | 1B | FB | SR | | LY | LD | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | DECEMBER | | | | JAN 11th | | FEB 7th | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | 4-25 | | 5-30 | S-30 | | S-30 | | | 2-20 | S-30 | S-30 | 1-20 | 2-30 | 7-30 | 13-30 | 7-20 | 3-29 | 8-28 | D | 20-30 | D | D | | D | D | | 9+ | 11+ | 15+ | | | | | | | | | | | | | | |
| Precip. ( in) | | .35 | | .40 | .20 | | .60 | | | .20 | .20 | Sn | 1.35 | .06 | 0 | .2 | .1 | .85 | 0 | .1 | 0 | 0 | 0 | | 0 | 0 | | 1.25 | 0 | 0 | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | 0 | | 0 | 0 | | 0 | | | 15 | 10 | 0 | 8 | 16 | 20 | 19 | 19 | 20 | 30 | 3 | 20 | 39 | 30 | | 22 | 24 | | 24 | 26 | 24 | | | | | | | | | | | | | | |
| LAS VEGAS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arsp | | D | | | | | | | | LG | | TG | | BV | | FG | 1B | FB | BO | SR | | LY | LD | | | | | | | | | | | | | | | | | | | | | |
| Grsp ♀ | | D | | | | | | | | LG | | | TG, BV | | | FG | 1B | FB | BO | SR | SD | LY | | | LD | | | | LG | | | | | | | | | | | | | | | |
| ♂ | | D | | | | | | | | LG | | | TG, BV | | | FG | 1B | FB | BO | SR | | SD | LY | | LD | | | | LG | | | | | | | | | | | | | | | |
| Cela | | LD | | | D | | | | | LG | | | | TG | | BV | | FG | 1B | FB | | SR | | | | LY | | | | | | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hija | | D | | | | | | | | | | | | | GS | | ½V | FS | HO, An | DS | | SD | BD | | | | | GS | | | | | | | | | | | | | | | | |
| Orhy | | D | | | | | | | | GS | | ½V | | | | | | FS | HO, An | An | HS | | BD | | | | | PD, GS | | | | | | | | | | | | | | | | |
| Sihy | | D | | | | | | | | GS | ½V | | | | | FS | | | HO, An | An | DS | HS | | | PD | | | | | | | | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spam | | D | | | | | | | | GS | | | | | | | | | 1B | FB | | SR | BD | | | | | GS | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | DECEMBER | | | | JAN 11th | | FEB 7th | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | S-30 | | S-30 | S-30 | | S-30 | | | 1-25 | 5-30 | Sn | S-30 | 2-30 | 6-30 | | S-30 | 2-30 | 9-25 | 15-28 | 15+ | D | D | | D | D | | 6+ | 10+ | 5+ | | | | | | | | | | | | | | |
| Precip. (in) | | .55 | | .60 | .25 | | .65 | | | .70 | .20 | Sn | 3.2 | .1 | 0 | | .15 | .75 | 0 | .1 | 0 | 0 | 0 | | 0 | 0 | | 2.25 | 0 | .35 | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | 0 | | 0 | 0 | | 0 | | | 4 | 8 | Sn | 5 | 12 | 21 | | 10 | 8 | 20 | 22 | 20 | 32 | 30 | | 22 | 22 | | 22 | 28 | 20 | | | | | | | | | | | | | | |
| LAS VEGAS 5-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | SD, LY | | | | | D | | | | | | | | | | | | LG, TG | | | | | | | FG | | | | 1B | | | | | | | | | | | | | | |
| Chvi | | SD, LY | | | | | D | | | | LG | | | | | | TG | | | | | | BV | | FG | | | 1B | | | FB | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hija | | D | | | | | | | | | | | | GS | | | ½V | | | | | HO | DS | | SD | | | GS | FS | HO | | | | | | | | | | | | | | |
| Orhy | | D | | | | | | | | | GS | | | ½V | | | | | FS | | HO | DS | SD | | BD | | | GS | | | | | | | | | | | | | | | | |
| Sihy | | D | | | | | | | | GS | | | ½V | | | | | FS | | HO | An | DS | SD | | PD | | | GS | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | DECEMBER | | | | JAN 11th | | FEB 7th | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | 1-30 | | 5-30 | 5-25 | | 5-30 | | | 2-30 | S-30 | Sn | 3-25 | 3-30 | 5-30 | 8-30 | S-30 | 2-25 | 6-20 | 12-20 | 10-28 | D | | D | D | D | | 6+ | 10+ | 12+ | | | | | | | | | | | | | | |
| Precip. (in) | | .45 | | .60 | .3 | | .9 | | | 1.0 | 2.5 | Sn | 3. | .04 | 0 | .2 | .25 | .6 | 0 | .25 | 0 | 0 | | .2 | 0 | 0 | | 1.75 | 0 | 0 | | | | | | | | | | | | | | |
| S.T.-°C | | 0 | | 0 | 0 | | 0 | | | 10 | 8 | Sn | 2 | 17 | 20 | 18 | 10 | 10 | 20 | 20 | 24 | 30 | | -- | 18 | 22 | | 24 | 24 | 23 | | | | | | | | | | | | | | |
| LAS VEGAS 5-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cost | | LD | | | | | D | | | | | | | LG | | | | | TG, BV | | | FG | | | | | | | | | | | | | | | | | | | | | | |
| Epvi | | LD | | | | | D | | | | | | | LG | | | | TG | | | | | | BV | FG | | | | LY | | | | | | | | | | | | | | | |
| Artr | | LD | LD, SD | | | | D | | | | | | | | | | | | LG | TG | | | | | BV | FG | | | | | | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hiri | | PD | D | | | | | | | | | | | | | | GS | ½V | | | | HO | | DS | BD | | | ½V | FS | | | | | | | | | | | | | | | |
| Bogr | | D | FS | | | | | | | BD | | | GS | | ½V | | | | | | | | | | BD | | | ½V | | | | | | | | | | | | | | | | |
| Sihy | | PD | | | D | | | | | | GS | | | ½V | | | | | FS | HO | An | DS | | SD | | BD | | ½V | | | | | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spam | | PD | D | | | | | | | | | | | | GS | | | | FS | | | 1B | | | BD | | | GS | | | | | | | | | | | | | | | | |

BATTLE
MOUNTAIN

CARROLL
SUMMIT

## BATTLE MOUNTAIN

Figure 1 shows the annual halogeton (*Halogeton glomeratus*) to have quite variable phenophases from year to year, while desert globemallow (*Sphaeralcea ambigua*) is somewhat variable, and arrowleaf balsamroot (*Balsamorhiza sagittata*) is very similar from year to year.

Bitterbrush (Purshia tridentata) and Mormon tea (*Ephedra nevadensis*) exhibit considerable variation in leaf and twig growth from year to year (Figure 2). Leaf growth seems to occur over a period of a month or less, while twigs grow from five weeks to over five months in some years.

The three perennial grasses squirreltail grass (*Sitanion hystrix*), bluebunch wheatgrass (*Agropyron spicatum*), and Indian ricegrass (*Oryzopsis hymenoides*) appear to maintain a fairly consistent phenotypic pattern from year to year irrespective of precipitation (Figure 3). Figure 4 bears out the same consistent pattern over the four year period.

Over the four years, bud sagebrush (*Artemesia spinescens*) varies throughout its growing season from four to seven weeks (Figure 5). Apparently, it is influenced fairly heavily by differences in climatic condtions. This certainly has implications for this important shrub if climatic phenomena can be directly related to a following season's growth.

Indian ricegrass has a very similar phenotypic pattern for all years except 1977 (Figure 6).

Squirreltail grass showed considerable more growth in 1979 than in the other years, and was also quite variable from year

to year (Figure 7). It appears that soil moisture was available for a considerably longer time period in 1979, particularly as opposed to 1976 where soil moisture dropped quickly along with height of the plant.

Leader growth in rabbitbrush was about average for 1979 among the previous three years (Figure 8).

Overall leader growth for shrubs and height growth for forbs and grasses in 1979 appears greater than for any of the three previous years (Table 1).

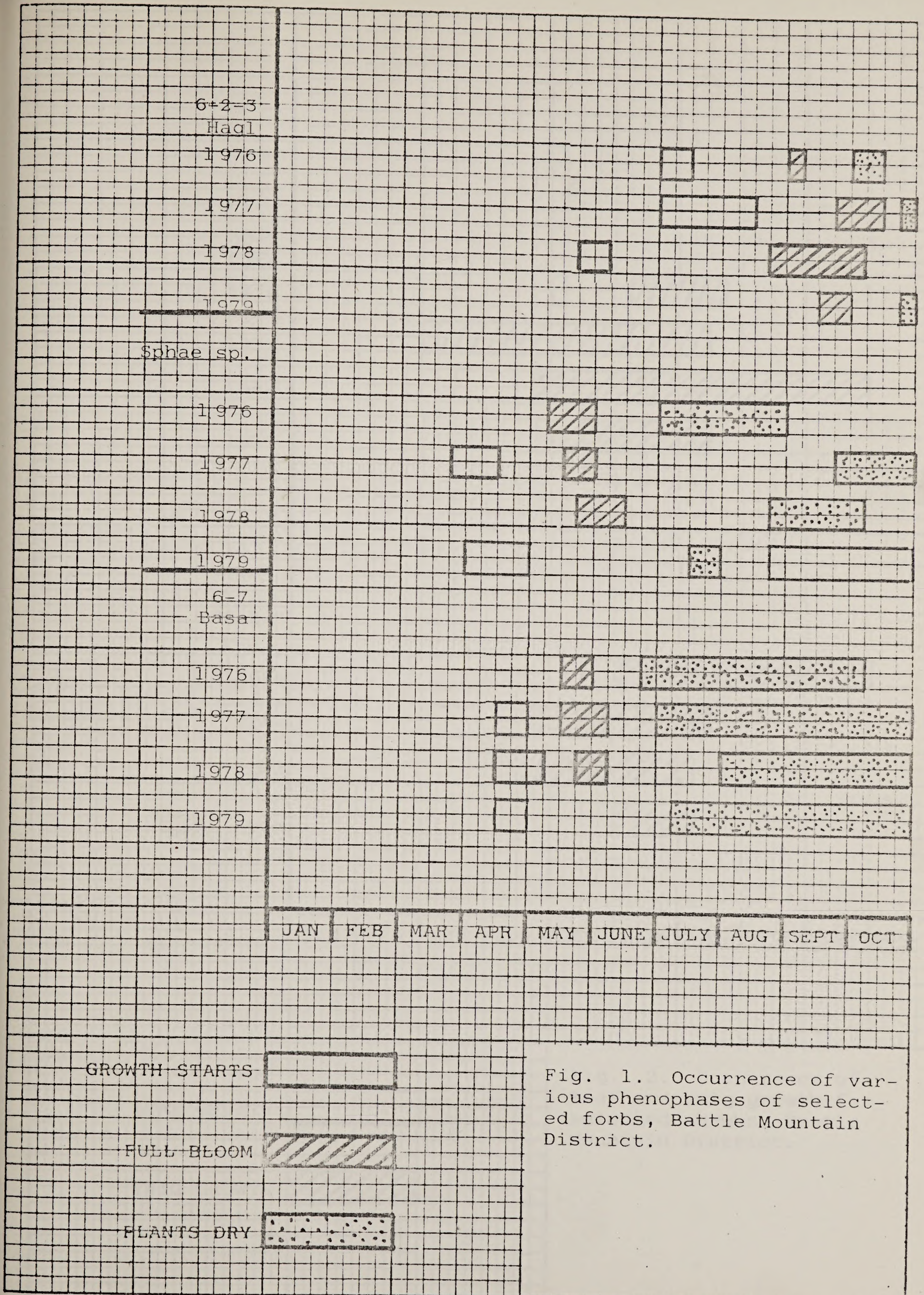


Fig. 1. Occurrence of various phenophases of selected forbs, Battle Mountain District.

CARROLL SUMMIT

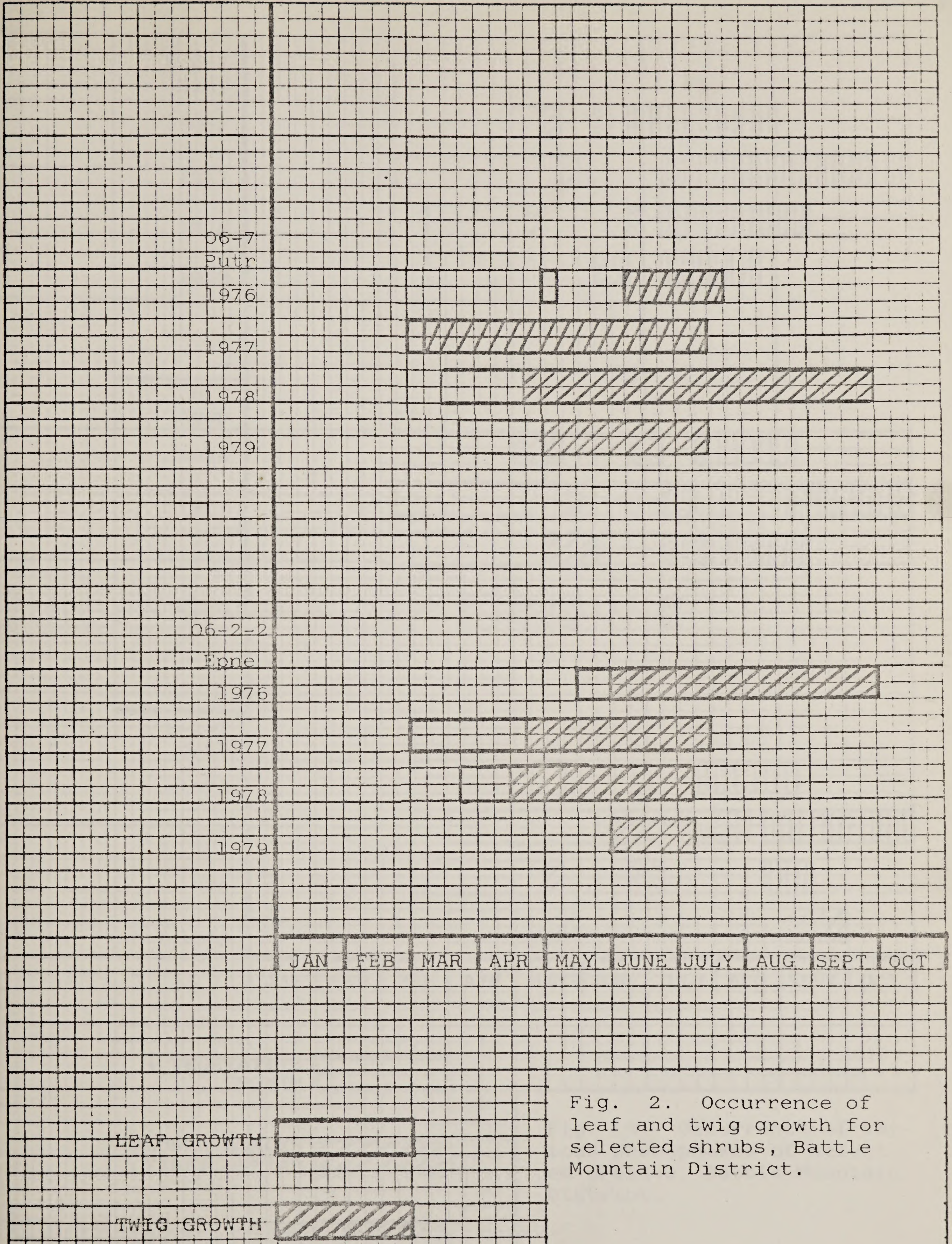


Fig. 2. Occurrence of leaf and twig growth for selected shrubs, Battle Mountain District.

CARROLL SUMMIT

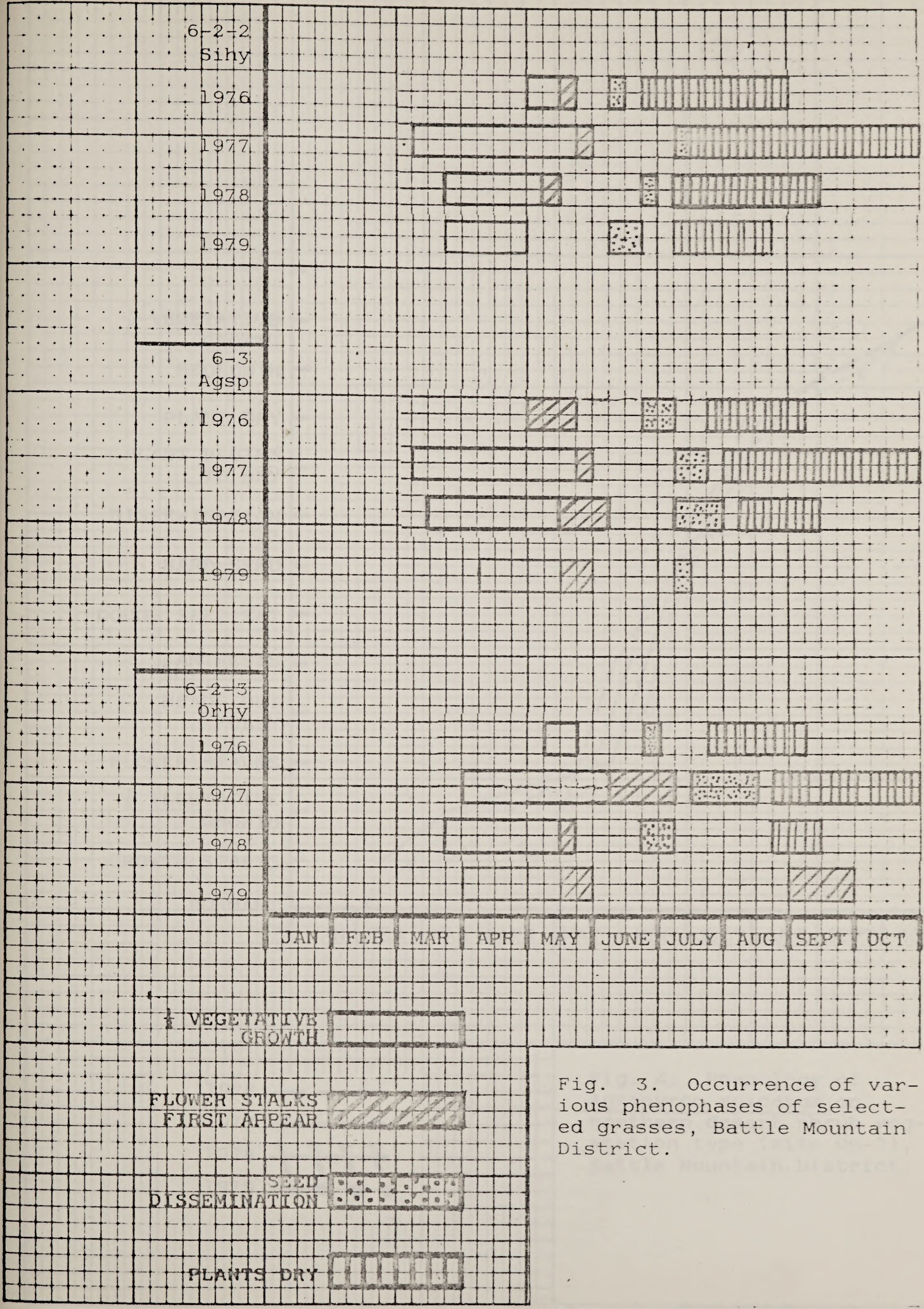


Fig. 3. Occurrence of various phenophases of selected grasses, Battle Mountain District.

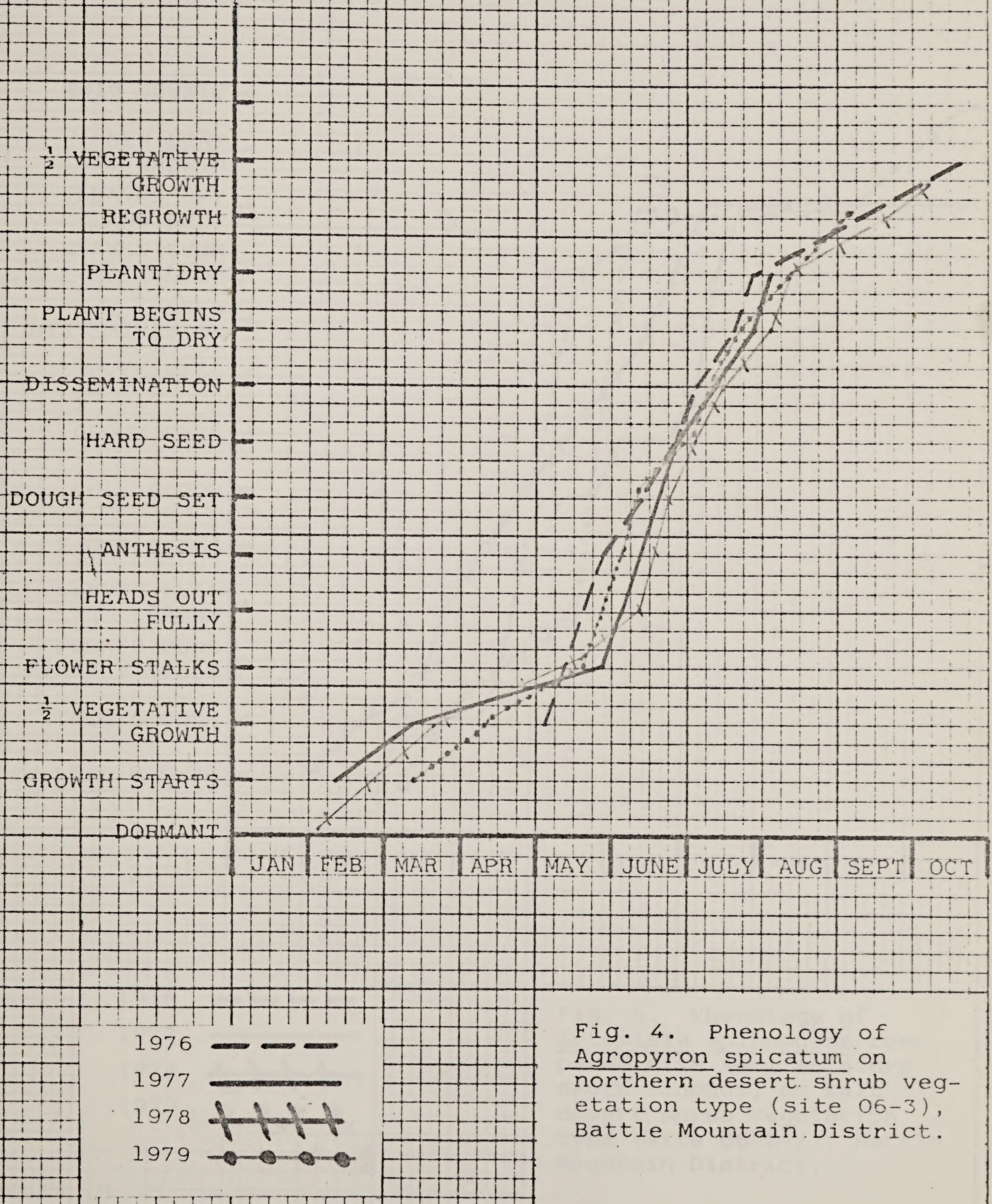
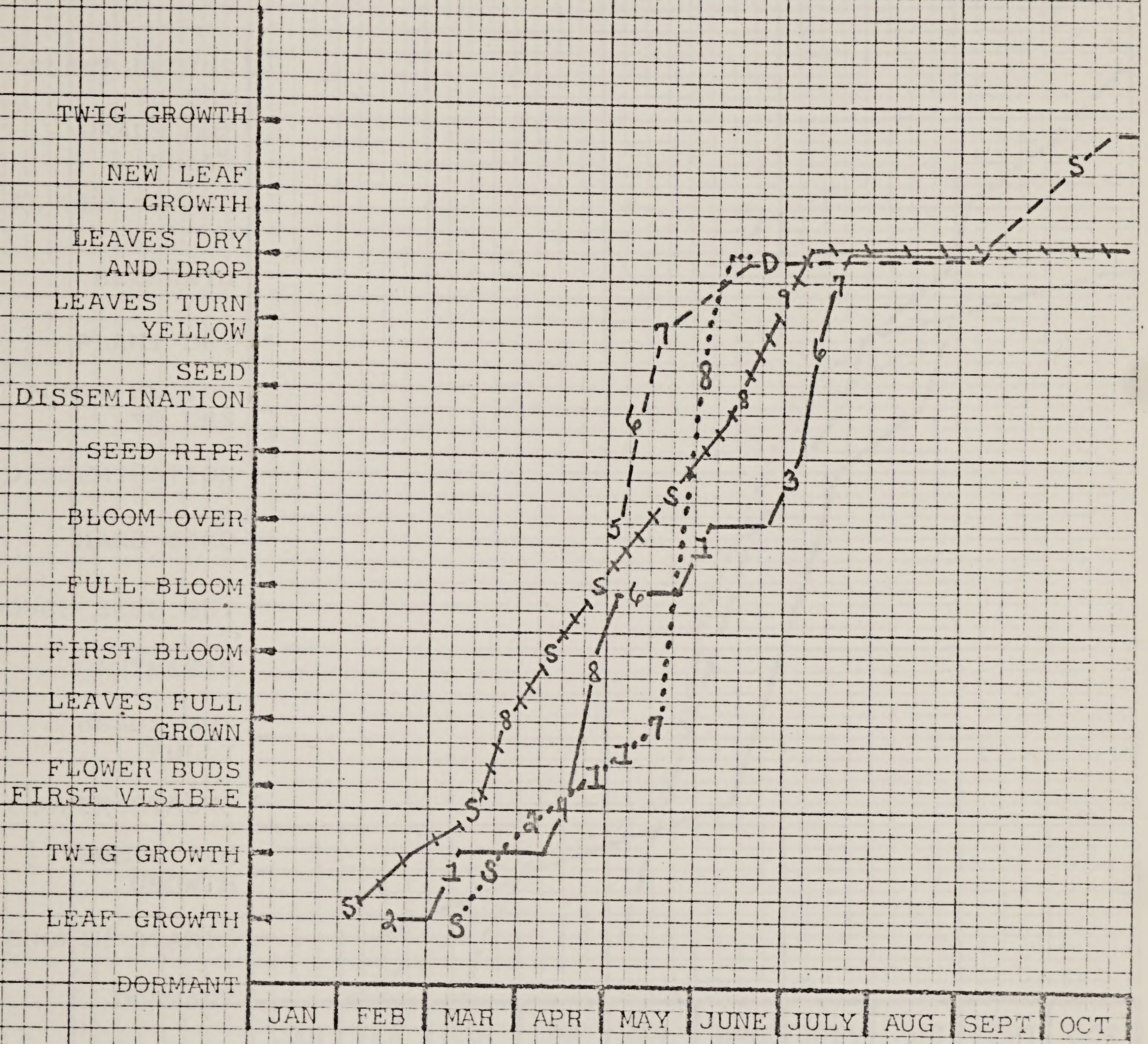


Fig. 4. Phenology of *Agropyron spicatum* on northern desert shrub vegetation type (site 06-3), Battle Mountain District.



| | |
|---|---|
| 1976 | — — — — |
| 1977 | ——— |
| 1978 | ┼┼┼┼ |
| 1979 | ● ● ● ● |

Fig. 5. Phenology of *Artemisia spinescens* compared with soil moisture depth (inches) on salt desert shrub vegetation type (site 06-2-2), Battle Mountain District.

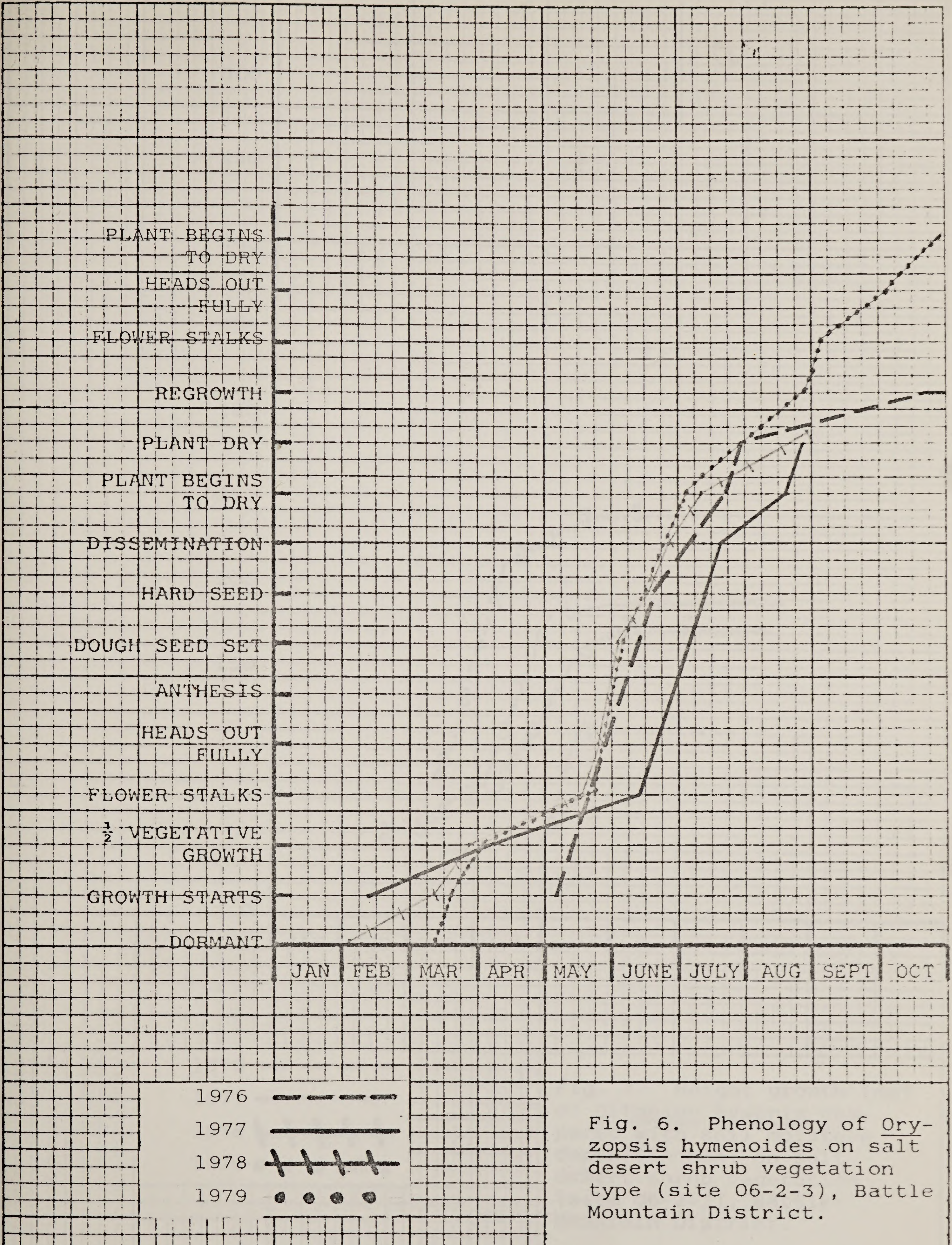


Fig. 6. Phenology of Oryzopsis hymenoides on salt desert shrub vegetation type (site 06-2-3), Battle Mountain District.

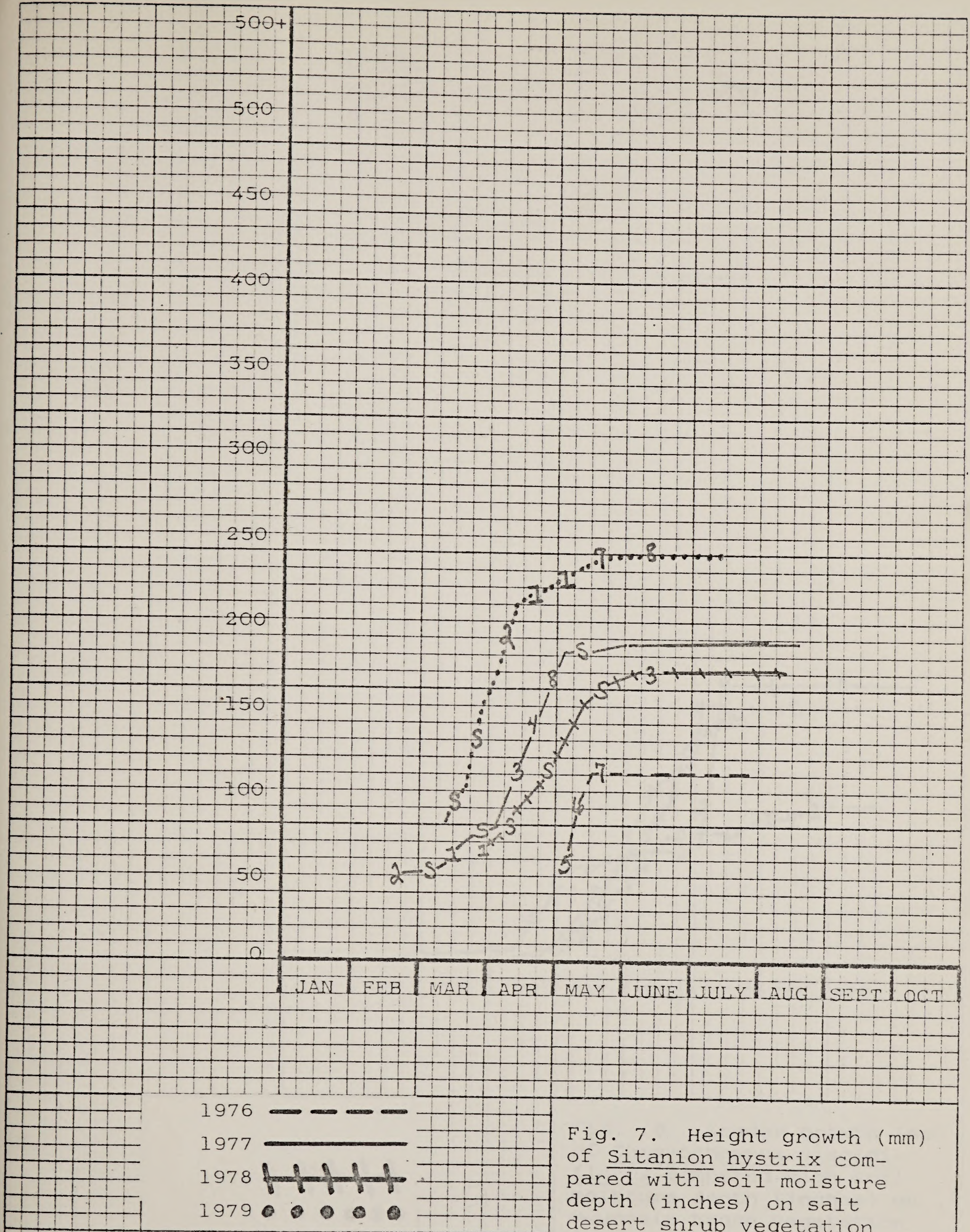


Fig. 7. Height growth (mm) of Sitanion hystrix compared with soil moisture depth (inches) on salt desert shrub vegetation (site 06-2-2), Battle Mountain District.

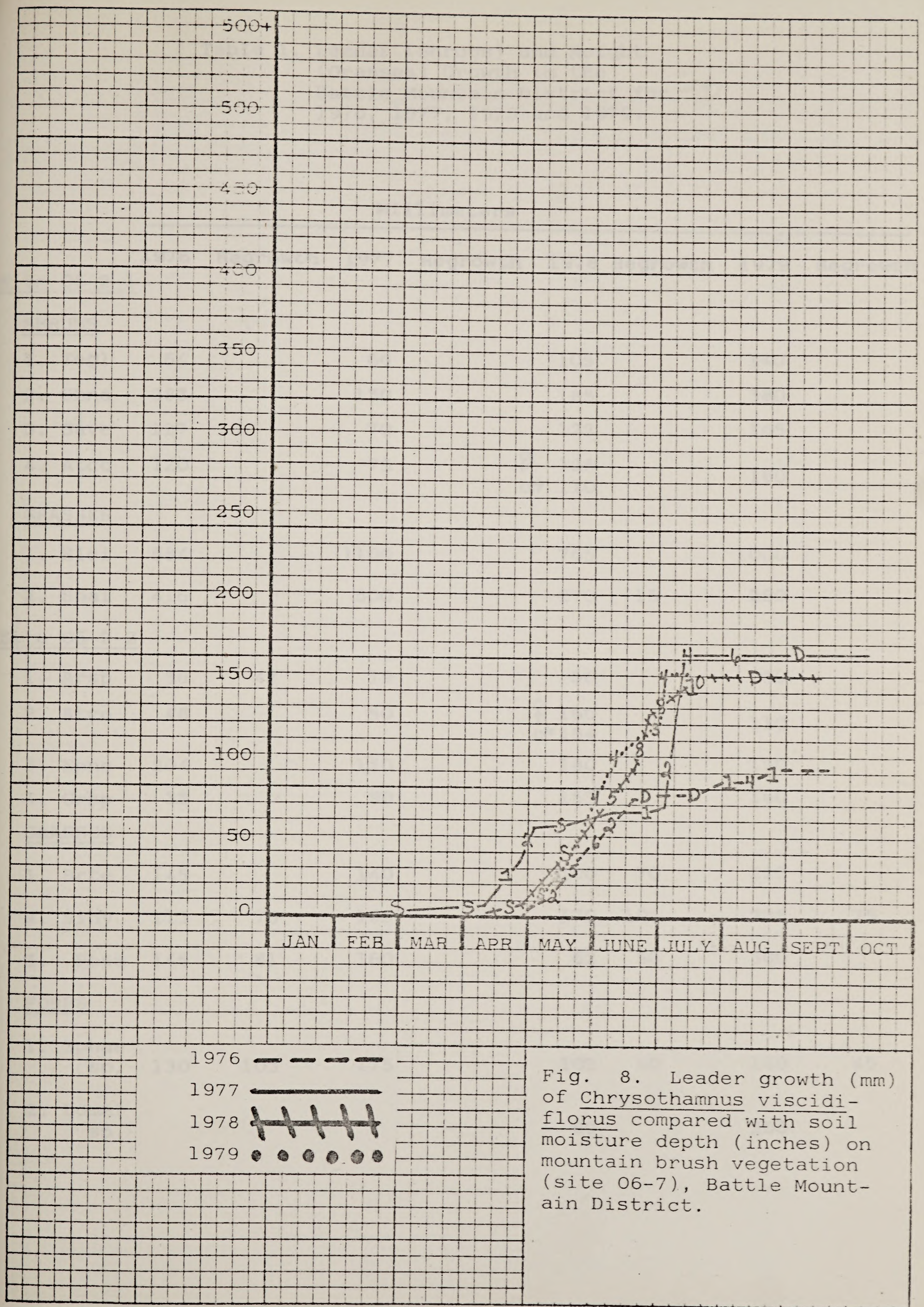


Fig. 8. Leader growth (mm) of Chrysothamnus viscidiflorus compared with soil moisture depth (inches) on mountain brush vegetation (site 06-7), Battle Mountain District.

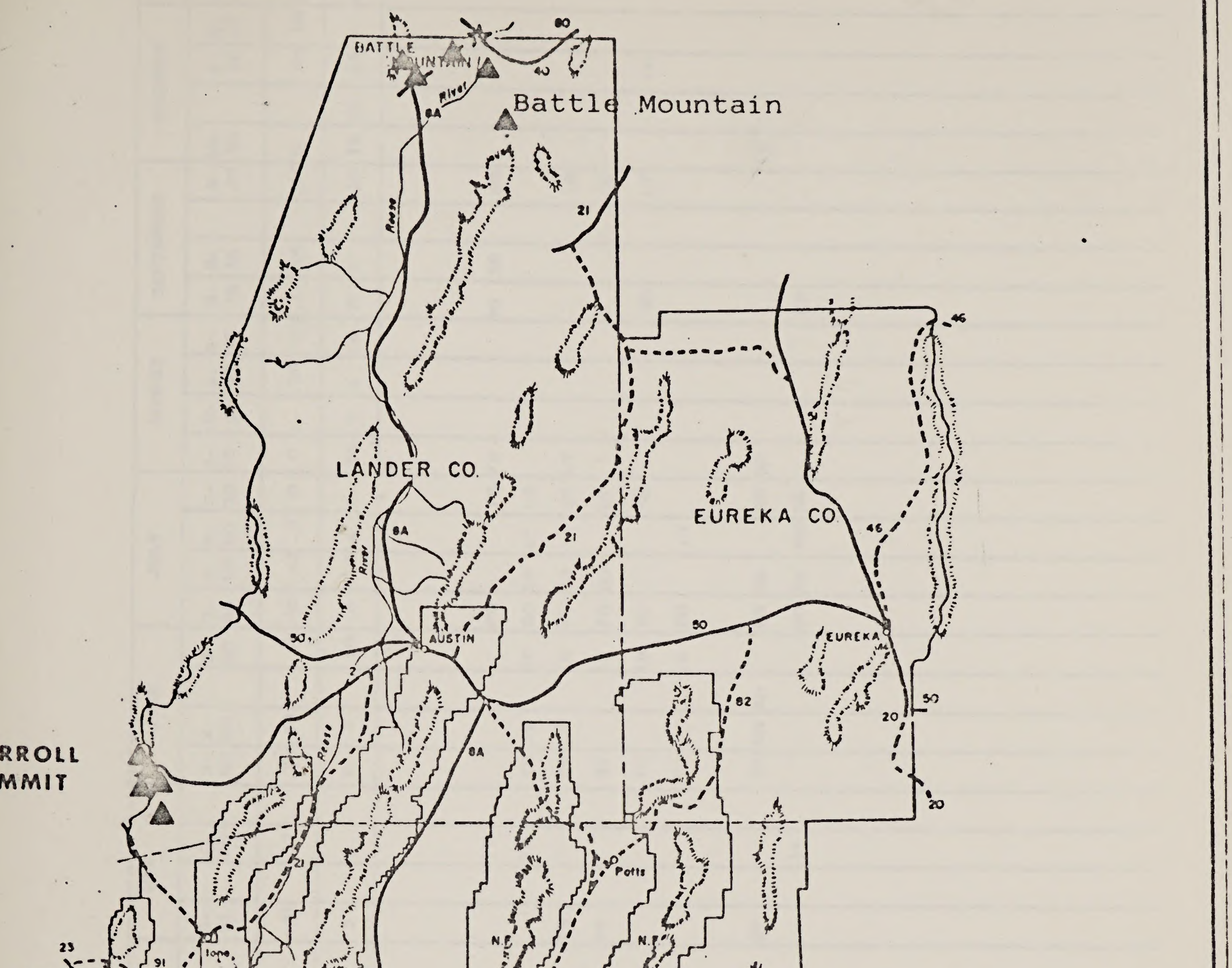
CARROLL SUMMIT

Table 1. Leader (Shrubs) and Height (Grasses) Growth in the Battle Mountain District for 1976, 1977, 1978 and 1979.

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 06-2-1 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Tegl | 64 | | 66 | | 105 | | 140 | |
| 2. Chna | 283 | | 130 | | 185 | | 380 | |
| 3. Save | 127 | | 70 | | 122 | | 165 | |
| 4. Atco | 120 | | 75 | | ♀ 125<br>♂ 110 | | 160 | |
| GRASSES | | | | | | | | |
| 1. Elci | 584 | | 1100 | | 765 | | 1000 | |
| 2. Spai | 416 | | 500 | | 270 | 15 | 260 | |
| Site 06-2-2 | | | | | | | | |
| 1. Arsp | 36 | 42 | 19 | | 50 | | 30 | |
| 2. Atco | 48 | | 50 | | ♀ 160<br>♂ 154 | | 110 | |
| 3. Epne | 204 | | 120 | | 180 | | 150 | |
| 4. Grsp | 33 | | 90 | | 165 | | 160 | |
| GRASSES | | | | | | | | |
| 1. Brte | 145 | | 140 | | 100 | 70 | 220 | |
| 2. Sihy | 113 | 73 | 185 | | 170 | 105 | 235 | 75 |
| 3. Posa | 145 | 81 | 160 | | 62 | 50 | 300 | |
| FORBS | | | | | | | | |
| 1. Sphae sp. | 130 | 103 | 175 | | 102 | 40 | 140 | 45 |
| 2. Lomat sp. | | | | | 60 | | 200 | |

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Site 06-2-3 | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| SHRUBS | | | | | | | | |
| 1. Cela | 70 | | | | 215 | | 190 | |
| 2. Atco | 65 | | | | 155 | | 60 | |
| 3. Grsp | 25 | 20 | | | ♀ 168<br>♂ 160 | | 75 | |
| 4. Arsp | 20 | 12 | | | 52 | | 60 | |
| GRASSES | | | | | | | | |
| 1. Sihy | 178 | | | | 170 | 70 | 130 | 60 |
| 2. Orhy | 150 | | | | 360 | 170 | 350 | 330 |
| 3. Brte | 145 | 55 | | | 130 | 50 | 170 | |
| FORBS | | | | | | | | |
| 1. Sphae sp. | 200 | | | | 80 | | 90 | 50 |
| 2. Hagl | 155 | | | | 175 | | 115 | |
| Site 06-3 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Arar | 62 | | 30 | | 188 | | 200 | |
| 2. Eriog sp. | 65 | | 46 | | 100 | | 200 | |
| 3. Chvi | 86 | | 75 | | 158 | | 130 | |
| 4. Pran | 97 | | 25 | | 110 | | 120 | |
| GRASSES | | | | | | | | |
| 1. Posa | 205 | | 65 | | 94 | 80 | 210 | |
| 2. Sihy | 279 | | 185 | | 215 | 105 | 250 | |
| 3. Agsp | 437 | | 500 | | 375 | 200 | 550 | |
| 4. Brte | 90 | | 56 | | 100 | 105 | 190 | |
| FORBS | | | | | | | | |
| 1. Crac | 90 | | 85 | | 125 | | 145 | |
| 2. Zigad sp. | 381 | | 240 | | 255 | | 300 | |

|  | Millimeters |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 6-3 Con't. |  |  |  |  |  |  |  |  |
| FORBS |  |  |  |  |  |  |  |  |
| 3. Phlox sp. | 13 |  | 15 |  | 52 | 16 | 70 |  |
| 4. Lomat sp. | 90 |  |  |  | 75 |  | 140 |  |
| 5. Astra sp. | 25 |  | 68 |  | 150 |  | --- |  |
| 6. Eriog sp. |  |  | 4 |  | 55 |  | 55 |  |
| 7. Alliu sp. |  |  |  |  | 100 |  | 140 |  |
| Site 06-7 |  |  |  |  |  |  |  |  |
| SHRUBS |  |  |  |  |  |  |  |  |
| 1. Putr | 76 |  | 40 |  | 185 |  | 170 |  |
| 2. Chvi | 92 |  | 165 |  | 138 |  | 150 |  |
| 3. Eriog sp. | 89 |  | 40 |  | 110 |  | 100 |  |
| 4. Artr | 154 |  | 65 |  | 255 |  | 220 |  |
| 5. Pran | 74 |  | 65 |  | 145 |  | 185 |  |
| GRASSES |  |  |  |  |  |  |  |  |
| 1. Agsp | 383 |  | 310 |  | 313 | 165 | 600 |  |
| 2. Posa | 175 |  | 200 |  | 100 | 90 | 280 |  |
| 3. Sihy | 251 |  | 225 |  | 210 | 135 | 270 |  |
| 4. Brte | 125 |  | 60 |  | 108 | 50 | 140 |  |
| FORBS |  |  |  |  |  |  |  |  |
| 1. Phlox sp. | 50 |  | 30 |  | 40 | 15 | 40 | 10 |
| 2. Basa | 305 |  | 400 |  | 365 |  | 300 |  |
| 3. Eriog sp. | 152 |  | --- |  | 70 |  | 150 |  |



# BATTLE MOUNTAIN DISTRICT

| SYMBOL 1979 | | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S-43 | S-43 | 3-46 | S-60 | 6-55 | 3-50 | | S-56 | | 4-60 | | 2-60 | 2-60 | | 2-60 | 3-60 | 4-60 | 5-60 | 2-50 | 3-35 | 0-35 | 4-50 | 5-35 | 9-35 | 9-36 | | S-40 | 10-30 | | 6-40 | 8-40 | S-40 | | 7-30 | |
| Precip. (in) | | | | | | | | | | | | | .2 | .10 | .5 | .17 | | .36 | | .17 | | .38 | .38 | | .42 | .42 | .42 | .3 | 0 | 0 | | .08 | .02 | .14 | .14 | | .16 | 0 | | .04 | .16 | .24 | | | |
| S.T.-°C | | | | | | | | | | | 1 | 2 | -2 | 1 | 1 | 3 | | 3 | | 6 | | 8 | 7 | | 10 | 8 | 10 | 4 | 7 | 10 | 7 | 4 | 4 | 6 | 2 | | 10 | 16 | 10 | 10 | 7 | 40 | | 0 | |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06-2-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chna | | | | | | | | | | | D | LG | | | | | | | | TG | | | | | | FG | | | IB | FB | | | | BO | SR | | SD | | | | | | | LD | |
| Tegl | | | | | | | | | | | D | LG | | | | | | | | TG | | FG | IB | | FB | BO | SD | LY | LD | | | | | | | | | | | | | | | | |
| Save | ♀ | | | | | | | | | | D | | LG | | | | | TG | | | | BV | | | IB | FB | BO | | SR | LY | | | | | | | LD | | | | | | | | |
| | ♂ | | | | | | | | | | D | | LG | | | | | TG | | | | BV | | | IB | FB | BO | | LY | | | | | | | | LD | | | | | | | | |
| Atco | ♀ | | | | | | | | | | D | | | | TG | | | | | | | FG | | | IB | BO | | | SR | | | | | SD | | | LY | | | LD | | | | | |
| | ♂ | | | | | | | | | | D | | | | TG | | | | | | | FG | | | IB | BO | | LY | | | | | | | | | | | | | | | | LD | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Elci | | | | | | | | | | | D | GS | | | | | | ½V | | | | FS | HO | An | | DS | HS | | SD | BD | | | | | | | | PD | | | | | | | |
| Spai | | | | | | | | | | | D | | | | | GS | | | | ½V | | | | | | HO | An | HS | SD | | | | | BD | | | | | | | | | | PD | |

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SUMMIT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | S-<br>38 | S-<br>40 | 1-<br>32 | S-<br>60 | 6-<br>42 | 3-<br>45 | | 3-<br>33 | | 17-<br>48 | |
| Precip. (in) | | | | | | | | | | | | 2.6 | 1.4 | .2 | .02 | | .43 | | .20 | |
| S.T.-$^{o}$C | | | | | | | | | | 2 | 1 | 1 | 1 | 3 | 5 | | 6 | | 12 | |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | | |
| 06-2-2 | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | |
| Arsp | | | | | | | | | | LG | | TG | | | BV | | | | FG | |
| Atco | | | | | | | | | | LG | | | TG | | BV | | | | FG | |
| Epne | | | | | | | | | | D | | | | | | | | | | |
| Grsp | | | | | | | | | | | | LG | | | TG | | BV | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | GS | | ½V | | | | | FS | | DS | |
| Posa | | | | | | | | | | GS | | ½V | | | FS | | HO | | DS | |
| Sihy | | | | | | | | | | GS | | ½V | | | | | HO | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | |
| Sphae sp. | | | | | | | | | | D | | | GS | | | | FS | | 1B | |
| Hagl | | | | | | | | | | D | | | | | | | | | | |

| SYMBOL 1979 | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | 20-<br>48 | 20-<br>48 | | 17-<br>40 | 20-<br>40 | 20-<br>40 | 1-<br>30 | 11-<br>30 | | 14-<br>30 | 9-<br>30 | 9-<br>35 | 8-<br>35 | 12-<br>30 | | S-<br>4.<br>18-30 | 22-<br>30 | | 17-<br>30 | 15-<br>30 | S-<br>35 | | | 3-<br>30 |
| Precip. (in) | .10 | .10 | | .2 | .2 | | | | | | | | | | | | | | | .1 | .3 | | | .05 |
| S.T.-$^{o}$C | 12 | 12 | | 11 | 12 | 12 | 10 | 13 | 0 | 9 | 7 | 8 | 8 | 6 | | 2 | 22 | | 13 | 9 | 6 | | | 3 |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | | | | | | |
| 06-2-2 | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | |
| Arsp | LY | LD | | | | | | | | | | | | | | | | | | | | | | |
| Atco | 1B | FB | | | BO | | SR | | | | | | | SD | | | | | | | | | | |
| Epne | TG | | | | BO | SD | | LY | | | | | | | | LD | | | | | | | | |
| Grsp | BO | | | | | SR | | LD | | | | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | BD | | | | | PD | | | | | | | | | | | | | | | | | | |
| Posa | BD | | | | PD | | | | | | | | | | | | | | | | | | | |
| Sihy | DS | SD | | BD | | PD | | | | | | GS | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | |
| Sphae sp. | BD | | | | | | PD | | | | | GS | | | | | | | | | | | | |
| Hagl | GS | | | FS | 1B | FB | | | | | | | | | | | SR | | DS | PD | | | | |

CARROLL
SUMMIT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | 1-51 | 5-44 | 2-30 | 10-60 | 2-60 | 3-60 | | 3-58 | | 8-50 | | 20-50 | 20-45 | | 15-45 | 17-40 | 18-35 | 1-35 | 9-35 | 17-40 | 18-35 | 3-35 | 6-30 | 17-45 | 18-40 | | 18 40 | 10-44 | | 8-40 | 8-40 | 5-9<br>12-40 | | 11-40 | |
| Precip. (in) | | | | | | | | | | | | .23 | 0 | .1 | .02 | | .53 | | 0 | | 0 | 0 | | .25 | 0 | 0 | .8 | | 0 | 0 | | | | | | | | | | .25 | .3 | | .07 | |
| S.T.-°C | | | | | | | | | | 2 | 2 | 4 | 2 | 3 | 5 | | 4 | | 10 | | 10 | 10 | | 10 | 16 | 12 | 10 | 11 | 18 | 10 | 10 | 10 | 10 | 10 | | 10 | 18 | | 10 | 12 | 5 | | 2 | |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06-2-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cela ♀ | | | | | | | | | | LG | | | TG | | | | | | FG | | FB | | | | BO | | | | LY | | LD | | | | | | | | SR | | | | SD | |
| ♂ | | | | | | | | | | LG | | | TG | | | | | | FG | | FB | | | | BO | | SR | SD | LY | | LD | | | | | | | | | | | | | |
| Atco ♀ | | | | | | | | | | D | | LG | | TG | | | | | | | FB | | | BO | | | SR | | | | | | | | | | SD | | | | | | | |
| ♂ | | | | | | | | | | D | | LG | | TG | | | | | | | FB | | | BO | | | SR | LY | | | | | | | | | | | | | | | | |
| Arsp | | | | | | | | | | LG | | TG | | | BV | | | | FG | | BO | | | | SD | LY | | LD | | | | | | | | | | | | | | | | |
| Grsp | | | | | | | | | | LG | | | | TG | | | BV | | FG | | BO | | | | | SD | LY | LD | | | | | | | | | | | | | | | | |
| Chvi | | | | | | | | | | LG | | | | | | | TG | | | | BV | | | FB | | | BO | SR | LY | | LD | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | GS | | | ½V | | | | | | FS | | DS | PD | | | | | | | | | | GS | | | | | | | | | | | | |
| Orhy | | | | | | | | | | D | GS | | ½V | | | | | | FS | | DS | | | | BD | | | | | | | GS | | | | | HO | | | BD | | | PD | |
| Brte | | | | | | | | | | GS | | ½V | | | | | HO | | | | DS | PD | | | | | | | | | | | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hagl | | | | | | | | | | D | | | | | | | | | | | | | | | | | | | | | | 1B | | | | | BO | | DS | PD | | | | |
| Sphae sp. | | | | | | | | | | GS | | | | | | | FS | | 1B | | BD | PD | | | | | | | | | | | GS | | | | | | | PD | | | | |

CARROLL
SUMMIT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | 1-23 | S-23 | 2-20 | S-60 | 1-32 | 2-25 | | S-26 | | 6-36 | | 10-38 | 16-35 | | 9-35 |
| Precip. (in) | | | | | | | | | | | | .18 | .3 | .1 | .1 | | 1.15 | | .30 | | .05 | 0 | | .45 |
| S.T.-°C | | | | | | | | | | 2 | 0 | 1 | 1 | 2 | 0 | | 1 | | | | 10 | 7 | | 14 |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | | | | | | |
| 06-3 | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | |
| Arar | | | | | | | | | | D | | LG | | | | | TG | | | | | | | BV |
| Eriog sp. | | | | | | | | | | D | | | LG | | | | TG | | | | BV | | | FG |
| Chvi | | | | | | | | | | LG | | | | | | | TG | | | | | | | 1B |
| Pran | | | | | | | | | | D | | LG | | | | | 1B | | BO | | | | | SR |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | GS | | | | ½V | FS | | HO | | An | | BD | | | |
| Sihy | | | | | | | | | | GS | | ½V | | | | | | | FS | | An | | | HS |
| Agsp | | | | | | | | | | GS | | | | ½V | | | | | FS | | An | DS | | |
| Brte | | | | | | | | | | GS | | ½V | | | | | | | HO | | DS | SD | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | |
| Eriog sp. | | | | | | | | | | D | | GS | | | | | FS | | FB | | | | | |
| Phlox sp. | | | | | | | | | | D | | | GS | | FS | | 1B | | FB | | DS | | | BD |
| Zigad sp. | | | | | | | | | | GS | | | | | | | FS | | FB | | BO | | | PD |
| Alliu sp. | | | | | | | | | | GS | | | | | | | | | | | PD | | | |
| Lomat sp. | | | | | | | | | | GS | | | 1B | | FB | | | | BO | | BD | PD | | |
| Crac | | | | | | | | | | D | | | GS | | | | | | 1B | | FB | | | BD |

| SYMBOL 1979 | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | 10-35 | 13-35 | S-30 | 7-30 | 10-30 | S-30 | 2-30 | 11-30 | 10-35 | 16-30 | | 2-8 16-32 | 18-32 | | 16-30 | 12-30 | S-30 | | 6-30 |
| Precip. (in) | 0 | 0 | | | | | .26 | .26 | .32 | .32 | | .26 | 0 | | .06 | .1 | 1.2 | | Fr. |
| S.T.-°C | 9 | 14 | 5 | 10 | 12 | 8 | 6 | 8 | 8 | 10 | | 20 | 22 | | 14 | 12 | 10 | | 4 |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | |
| 06-3 | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | |
| Arar | | FG | | 1B | | | | | | | | | FB | | BO | SD | | | LY |
| Eriog sp. | 1B | | | FB | | | | | | | | | BO | | SR | LY | LD | | |
| Chvi | | | FB | | BO | | SR | | SD | LY | | | | | | | LD | | |
| Pran | | | | | SD | | | | | | | | LD | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | |
| Posa | | | PD | | | | | GS | | | | | PD | | | | | | |
| Sihy | SD | | BD | PD | | | | GS | | | | | | | | | | | |
| Agsp | HS | SD | BD | | | | | | GS | | | | | | | | | | |
| Brte | BD | | | PD | | | | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | |
| Eriog sp. | BO | SR | DS | | BD | | PD | | | | | | | | | | | | |
| Phlox sp. | | PD | | | | | | | | | | | | | | | | | |
| Zigad sp. | | | | | | | | | | | | | | | | | | | |
| Alliu sp. | | | | | | | | | | | | | | | | | | | |
| Lomat sp. | | | | | | | | | | | | | | | | | | | |
| Crac | | | | | | PD | | | | | | | | | | | | | |

CARROLL
SUMMIT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | S-30 | S-30 | S-20 | S-60 | S-35 | 1-35 | | S-30 | | 5-30 | | 10-37 | 10-35 | | 7-35 | 9-30 | 11-30 | 2-30 | 13-35 | 21-35 | 22-35 | S-30 | 2-30 | S-35 | 13-35 | | S-3. 15-30 | 20-30 | | 17-30 | 14-30 | S-30 | | 4-30 | |
| Precip. (in) | | | | | | | | | | | | .17 | .4 | .35 | .05 | | .9 | | .45 | | .05 | 0 | | .3 | 0 | 0 | | | | | .5 | .5 | .15 | 0 | | .06 | 0 | | .08 | .2 | .5 | | Fr. | |
| S.T.-$^{o}$C | | | | | | | | | | 0 | 0 | 0 | 1 | 1 | 2 | | 4 | | 8 | | 8 | 8 | | 10 | 14 | 10 | 10 | 10 | 15 | 10 | 4 | 8 | 10 | 8 | | 4 | 16 | | 10 | 10 | 4 | | 0 | |
| BATTLE MOUNTAIN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eriog sp. | | | | | | | | | | D | | | LG | | | | TG | | | | BV | | | | FG | | FB | | | | BO | | | | | | | | SR | LY | LD | | | |
| Artr | | | | | | | | | | D | | | LG | | | | TG | | | | | | | | BV | FG | | | | | | | | | | 1B | FB | | | BO | SR | | SD | |
| Putr | | | | | | | | | | | | LG | | | | TG | BV | | 1B | | BO | | | SR | | | SD | | | | | | | | | | LY | | | | | | | |
| Pran | | | | | | | | | | D | | LG | | | | | TG | | FB | | BO | | | SR | | | | | SD | | | | | | | | LY | | | | LD | | | |
| Chvi | | | | | | | | | | | | LG | | | | | TG | | | | | | | | BV | | FG | 1B | BO | | SD | | | | | LG | | | | | | | | |
| Saca | | | | | | | | | | | | | | | | | | | | | | TG | | FG | | FB | BO | SR | LY | | | | | | | | | | | | LD | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | GS | | | | | | | ½V | | HO | | DS | HS | | | SD | BD | PD | | | | | | | | | | | | | | | | | |
| Agsp | | | | | | | | | | GS | | | | | | | ½V | | | | HO | | | | An | DS | SD | | BD | | | | | | | | | | | GS | | | | |
| Posa | | | | | | | | | | GS | | | | | ½V | | FS | | | | HS | SD | | | BD | | PD | | | | | | | | | | | | | GS | | | | |
| Sihy | | | | | | | | | | GS | | | | | | | ½V | | | | HO | | | An | HS | SD | | BD | PD | | | | GS | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eriog sp. | | | | | | | | | | D | | | GS | | | | | | | | FS | | | FB | | | | | SR | DS | BD | | | | | | | | | PD | | | | |
| Phlox sp. | | | | | | | | | | D | | GS | | | | | 1B | | FB | | | BO | | | DS | BD | PD | | | | | GS | | | | | | | | | | | | |
| Basa | | | | | | | | | | D | | | | | GS | | 1B | | | | SR | DS | | BD | | PD | | | | | | | | | | | | | | | | | | |

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A review of four years data including 1979 shows no radical departures from the patterns established during the first three years of the study. Indian ricegrass (Oryzopsis hymenoides) began its growth early and most other phenophases occurred earlier in 1979 (Figure 1).

However, the opposite is shown in the description of phenophases for squirreltail grass (Sitanion hystrix) and desert globemallow (Sphaeralcea ambigua), where these two species began growth later in 1979 than for the previous three years (Figures 2 and 3).

Bud sagebrush (Artemisia spinescens) completed its life cycle a few weeks earlier in 1979 (Figure 4) than in 1976 and 1978. However, almost all of its phenophases occurred earliest in 1977. Figure 5 suggests that, relative to leaf and twig growth of shrubs, 1978 and 1979 were both earlier years than were 1976 and 1977. A similar relationship is found with grasses, since seed dissimination of Indian ricegrass and Galleta (Hilaria jamesii) occurred somewhat earlier, especially in 1979 (Figure 6). Total height growth of Indian ricegrass was least in 1979, a possible result of relatively dry soil at the end of April (Figure 7).

Shrub leader growth and regrowth revealed no surprises when the data were compared (Table 1). This last year (1979) seems to be about average relative to leader growth.

Winter fat (Ceratoides lanata) seemed to have very poor seed production this year.

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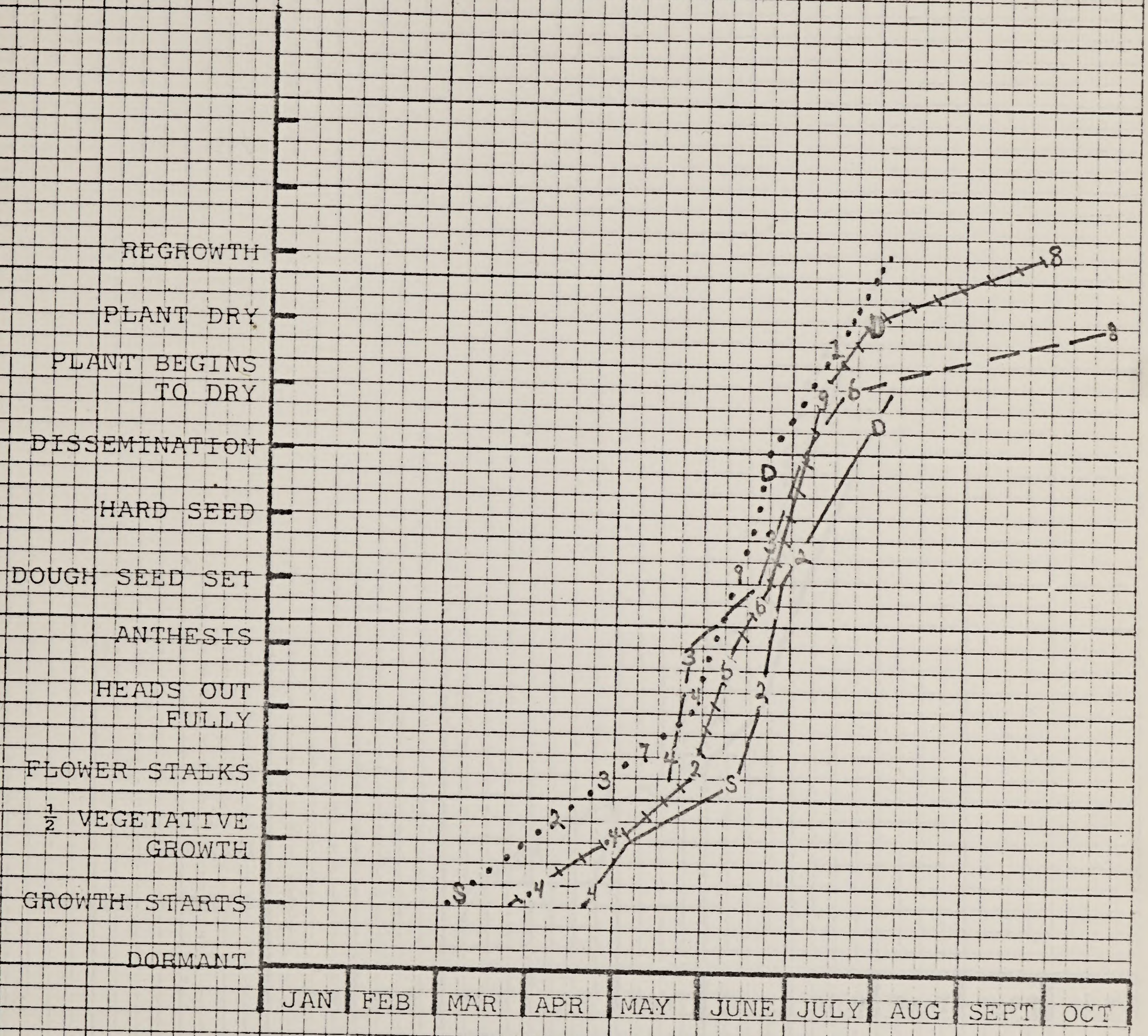

Fig. 1 . Phenology of Oryzopsis hymenoides compared with soil moisture depth (inches) on a salt desert shrub vegetation type (site 06A-2-1), Tonopah District.

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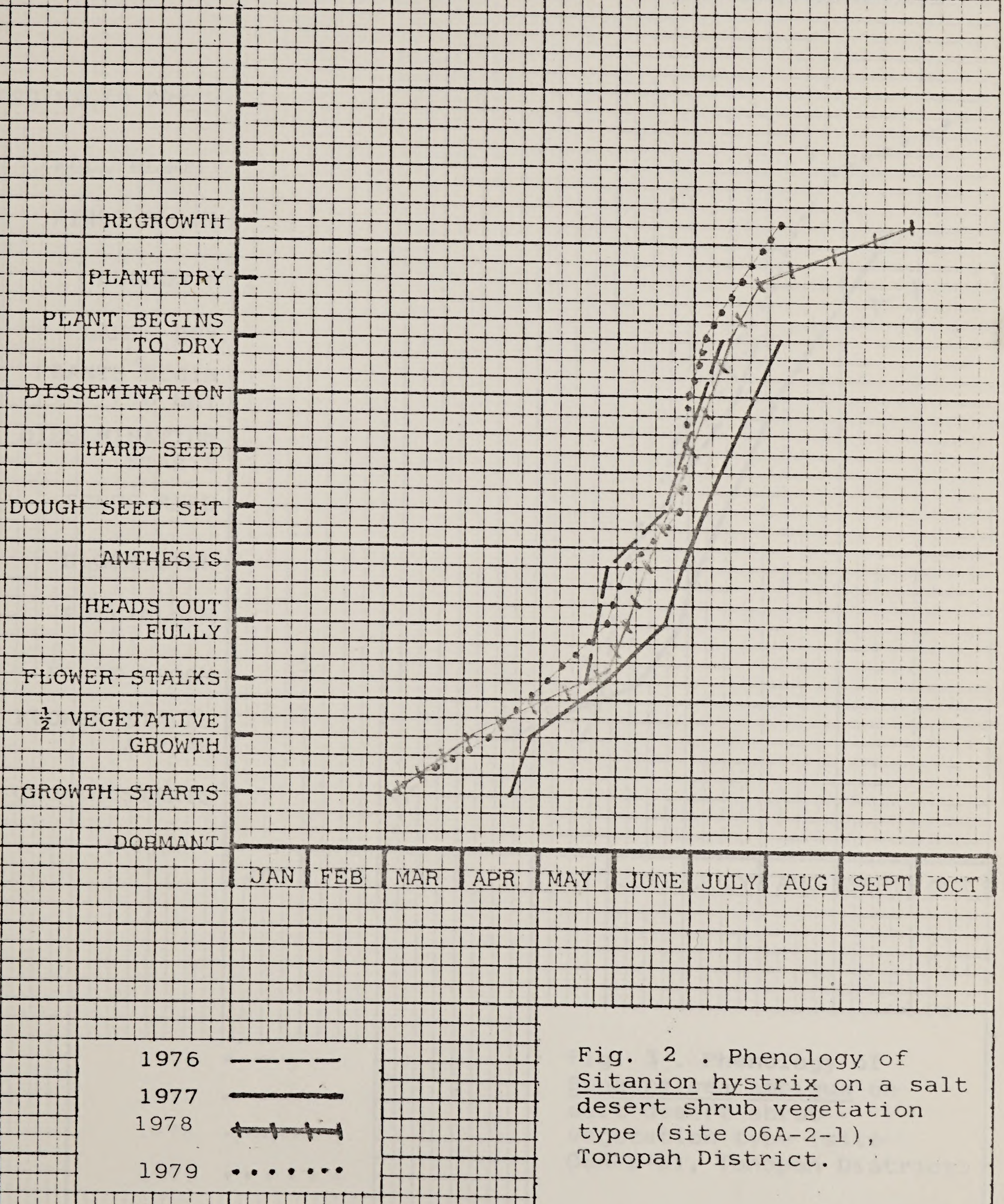

Fig. 2 . Phenology of *Sitanion hystrix* on a salt desert shrub vegetation type (site 06A-2-1), Tonopah District.

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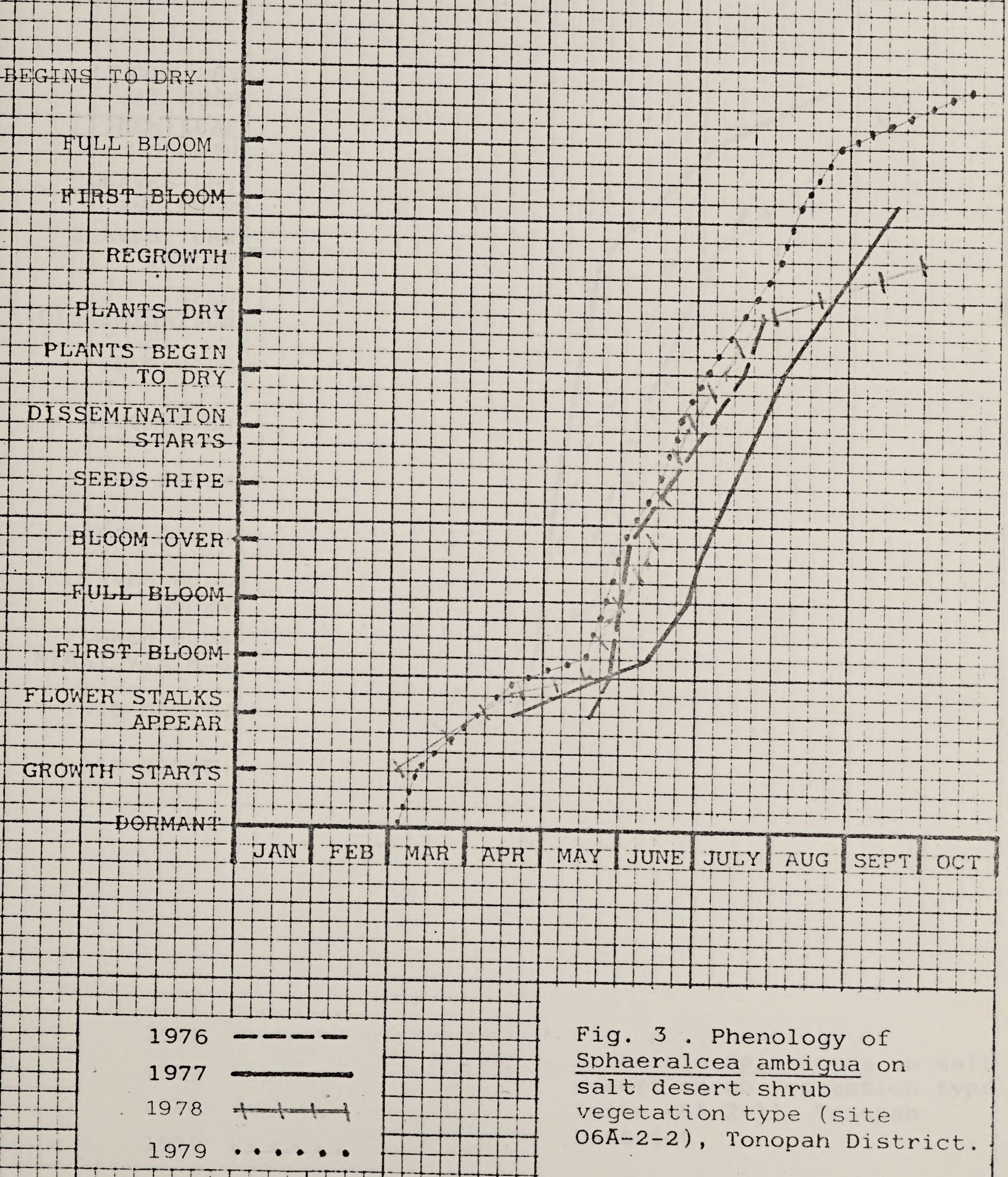

Fig. 3 . Phenology of Sphaeralcea ambigua on salt desert shrub vegetation type (site 06A-2-2), Tonopah District.

CARROLL SUMMIT

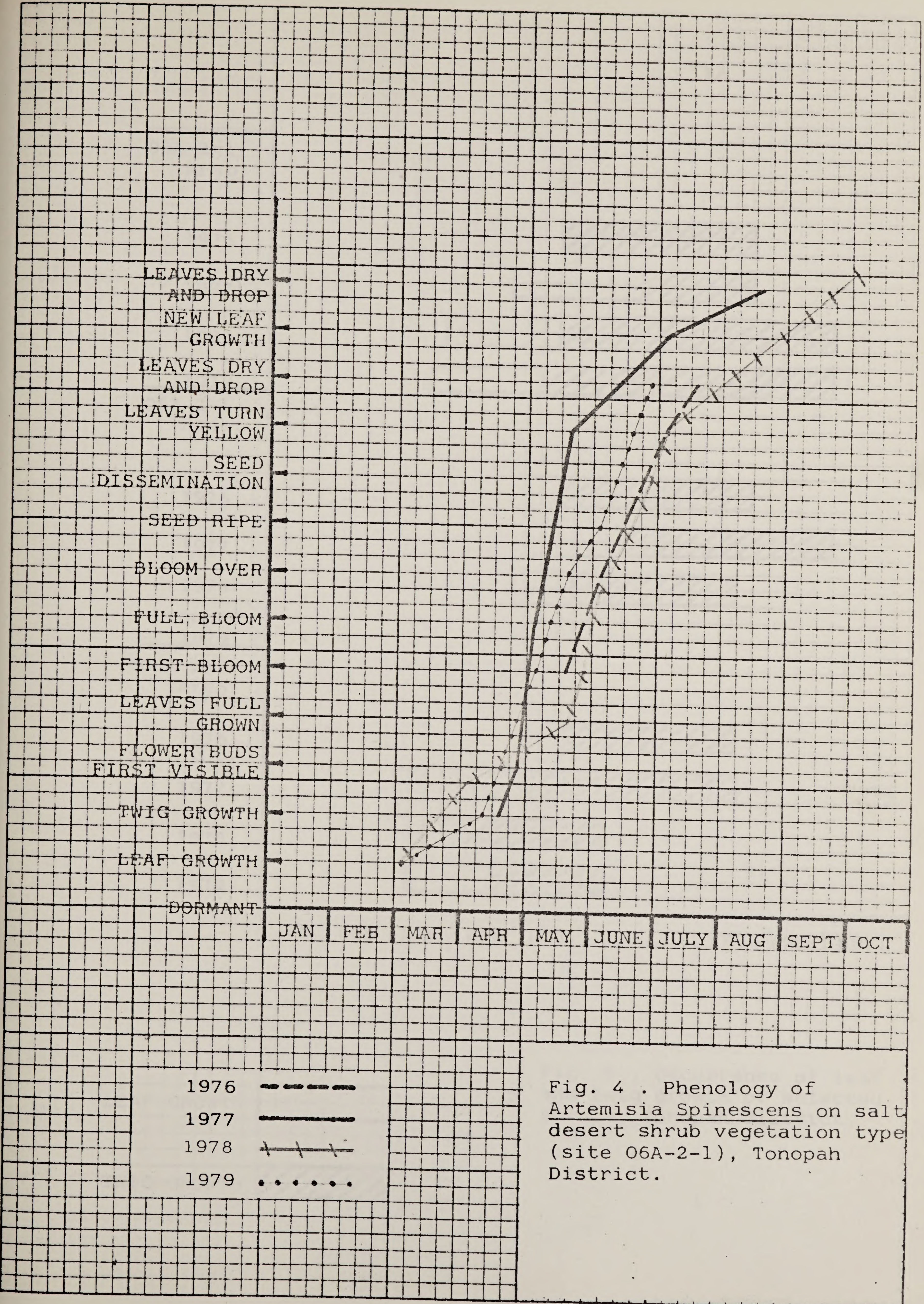

Fig. 4 . Phenology of Artemisia Spinescens on salt desert shrub vegetation type (site 06A-2-1), Tonopah District.

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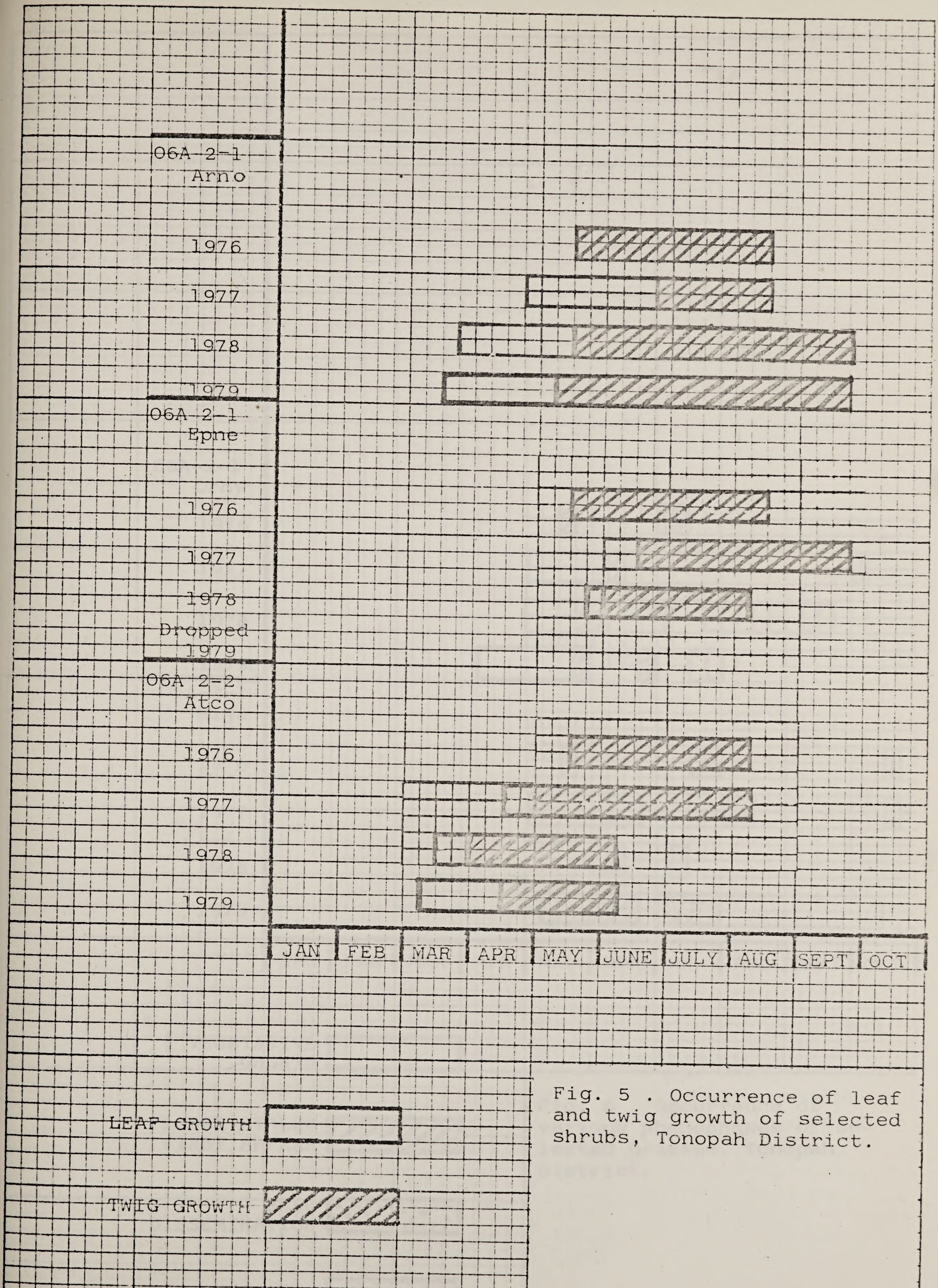

Fig. 5 . Occurrence of leaf and twig growth of selected shrubs, Tonopah District.

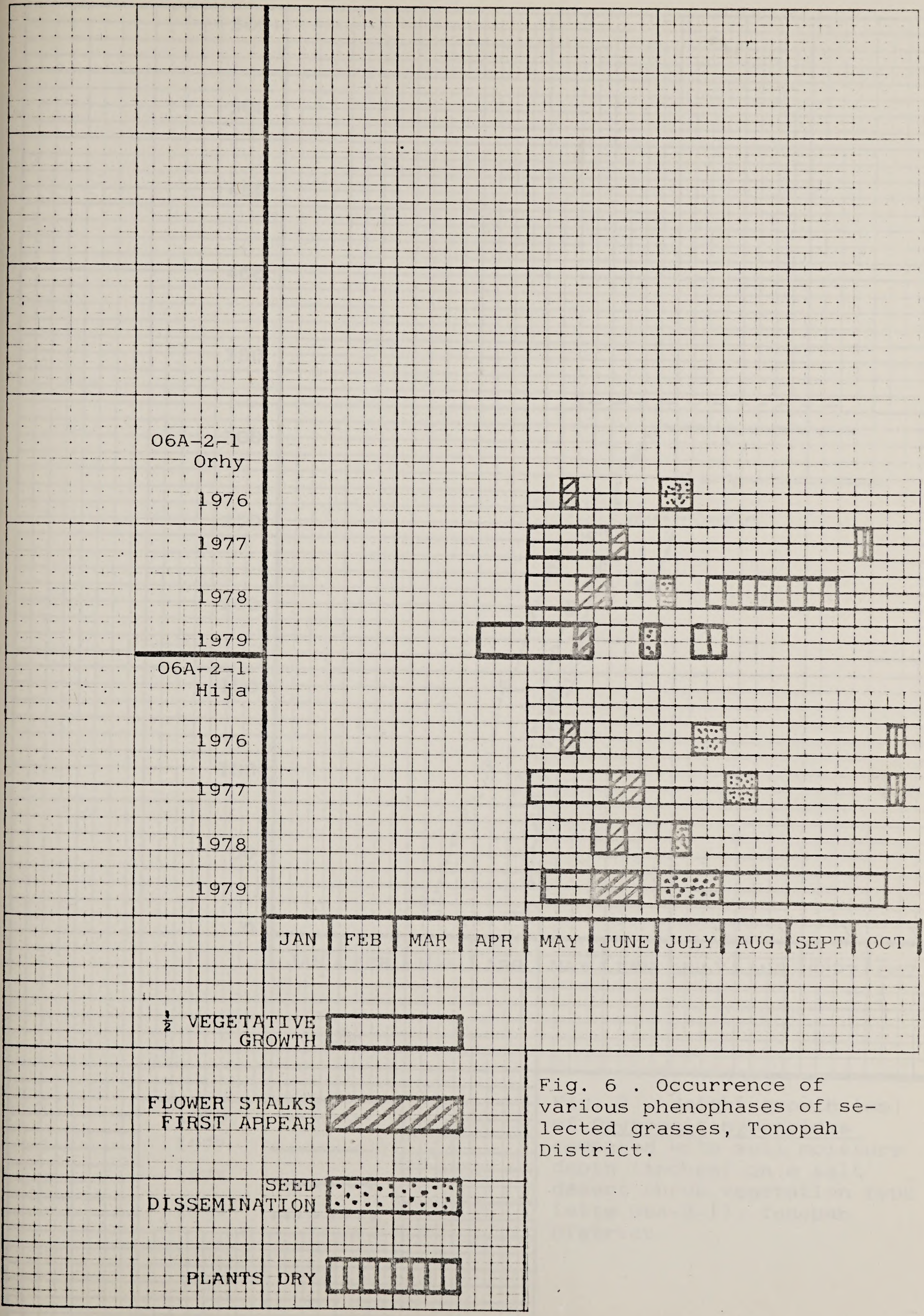

Fig. 6 . Occurrence of various phenophases of selected grasses, Tonopah District.

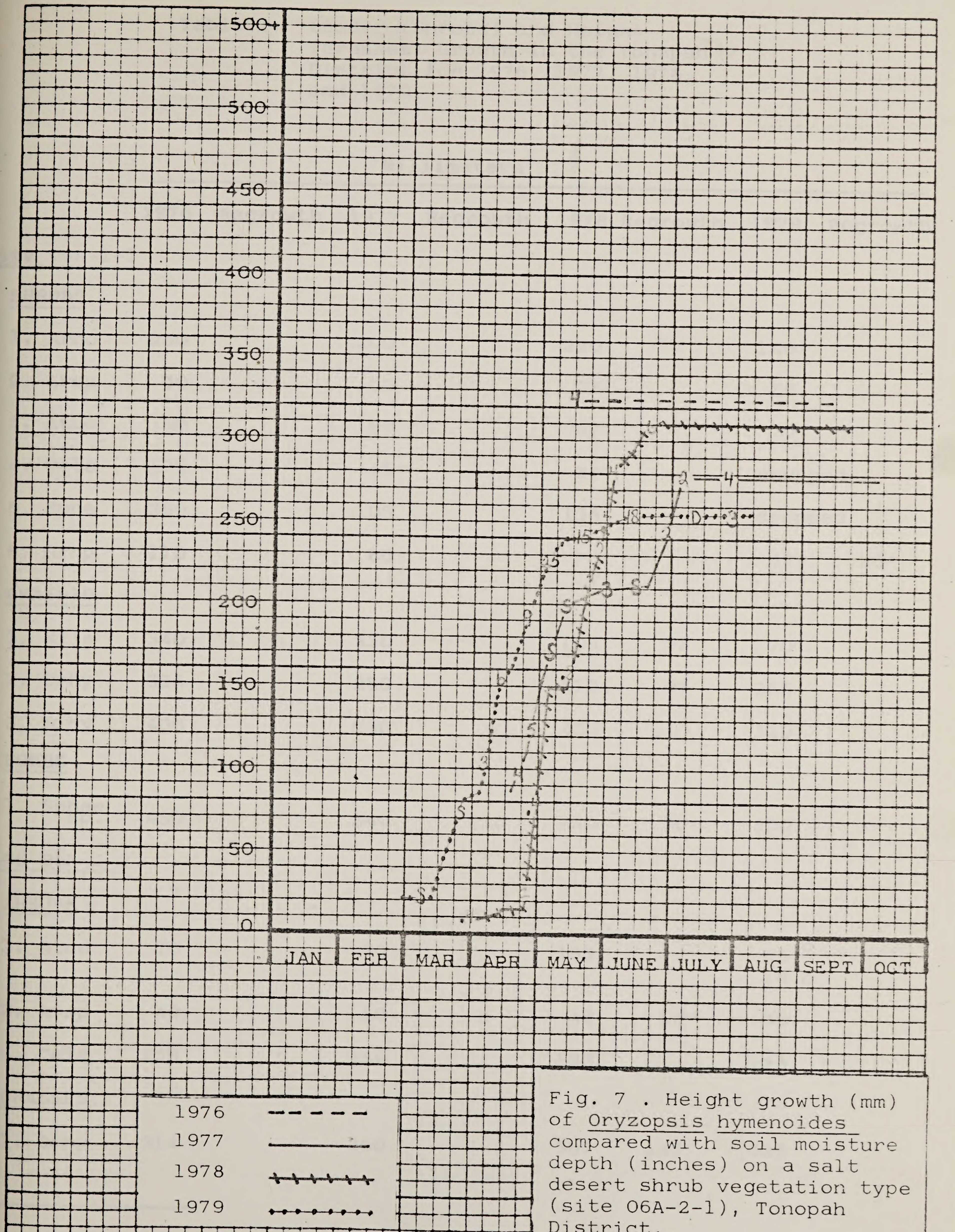

Fig. 7 . Height growth (mm) of Oryzopsis hymenoides compared with soil moisture depth (inches) on a salt desert shrub vegetation type (site 06A-2-1), Tonopah District.

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Table 1. Leader (Shrubs) and Height (Grasses) Growth in the Tonapah District for 1976, 1977, 1978, and 1979.

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 06A-2-1 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Arno | 230 | | 200 | | 220 | | 140 | |
| 2. Arsp | 30 | | 20 | | 23 | | 16 | |
| 3. Atco | 60 | | 60 | | 87 | | 70 | |
| 4. Cela | 170 | | 45 | | 23 | | dropped | |
| 5. Epne | 250 | | 105 | | 135 | | dropped | |
| 6. Grsp | 110 | | 60 | | 70 | | 35 | LG* |
| GRASSES | | | | | | | | |
| 1. Hija | 340 | | 330 | | 105 | 52 | 70 | |
| 2. Orhy | 324 | | 280 | | 310 | 97 | 255 | |
| 3. Sihy | 400 | | 290 | | 400 | 140 | 330 | |
| FORBS | | | | | | | | |
| 1. Sphae sp. | 450 | | 340 | 110 | 440 | 30 | 320 | |
| Site 06A-2-2 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Atco | 70 | | 70 | | 155 | | 35 o<br>18 o | |
| 2. Arsp | 40 | | 20 | 2 | 43 | LG* | 35 | |
| 3. Cela | 235 | | 180 | | 180 | | 235 | |
| GRASSES | | | | | | | | |
| 1. Orhy | 314 | | 260 | | 367 | 145 | 325 | |

---

*LG=leaf growth

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 06A-2-2 | | | | | | | | |
| Con't | | | | | | | | |
| FORBS | | | | | | | | |
| 1. Spam | 500 | | 310 | 310 | 440 | GS* | 400 | |
| Site 06A-3 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 220 | | 125 | | 180 | | 152 | |
| 2. Come | 120 | | 75 | | 90 | | 52 | |
| 3. Grsp | | | | | | | 37 | |
| 4. Atca | | | | | | | 42 | |
| 5. Epne | | | | | | | 80 | |
| 6. Pran | | | | | | | 18 | |

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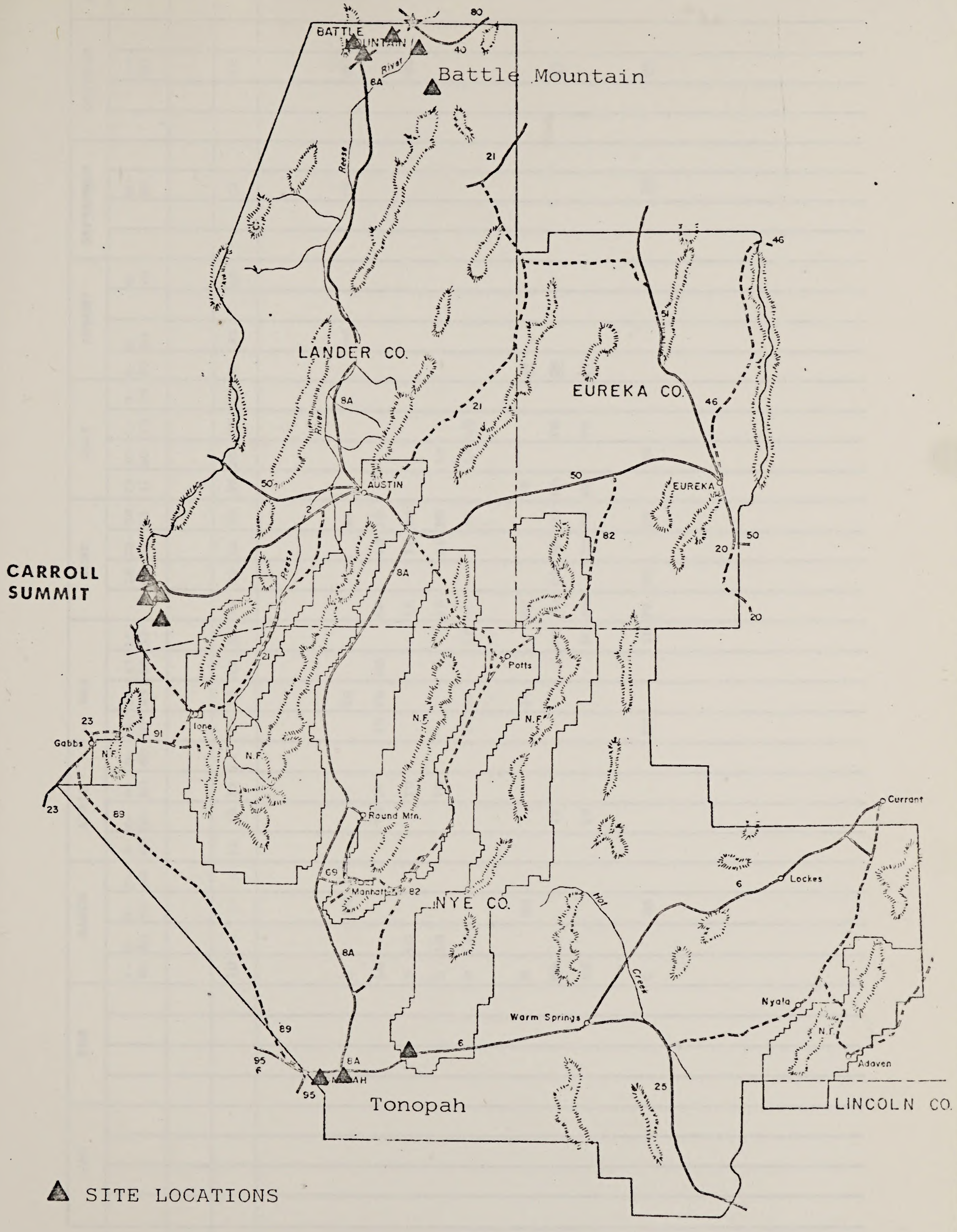
*GS=growth starts



BATTLE MOUNTAIN DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | 1-60 | S-60 | S-60 | S-60 | 3-60 | 6-60 | 6-60 | 9-60 | 25-60 | 25-45. | 13-60 | 15-30 | | 18-60 | 28-51 | 28-51 | 28-51 | 30-50 | 1-15 | 3-38 | 5-60 | 3-60 | | 8-60 | | | 20-60 | | | | 10-60 | | | | | |
| Precip. (in) NONE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | 10 | 4 | 7 | 4 | 12 | 12 | 12 | 14 | 16 | 16 | 22 | 22 | 24 | 22 | 24 | 26 | 26 | 26 | 27 | 25 | 30 | 25 | | 25 | | | 22 | | | | 12 | | | | | |
| TONOPAH 06A-2-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arno | | | | | | | | | D | | LG | | | | | | | TG | | | | | | BV | | | | | | FG | | | | | 1B | | | | SD | | | | | |
| Arsp | | | | | | | | | LG | | | | | TG | BV | | 1B | FB | BO | | SR | | LY | LD | | | | | | | | | | | | | | | | | | | | |
| Atco ♀ | | | | | | | | | D | LG | | | | | TG | | | | | | 1B | | FB | BO | | | | | | | | | | | | | | | SR | | | | | |
| ♂ | | | | | | | | | D | LG | | | | | TG | | | | | | 1B | | FB | BO | | LY | | | | | | | | | | | | | | | | | | |
| Grsp | | | | | | | | | D | LG | | | | | | | TG | BV | | 1B | BO | | | SD | | LY | LG | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hija | | | | | | | | | D | | GS | | | | | | | ½V | | | FS | | | | SD | | | | ½V | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | GS | | | | | ½V | | | | | | FS | An | DS | HS | SD | BD | | PD | | GS | | | | | | | | | | ½V | | | | | |
| Sihy | | | | | | | | | GS | | | | | ½V | | | | | | HO | An | | DS | SD | BD | | PD | | ½V | | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sphae sp. | | | | | | | | | D | | GS | | | | | | FS | | | 1B | FB | BO | | DS | | BD | | | | | | | | | 1B | | | | DS | | | | | |

CARROLL
SUMMIT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | 1-60 | 1-60 | 1-60 | S-60 | 3-51. | 4-60 | 10-60 | 10-60 | 13-60 | 14-60 | 14-60 | 15-60 | | 28-60 | 30-46 | 30-46 | 30-46 | 33-46 | 1-40 | 43-60 | 15-51 | 3-60 | | 8-60 | | | 2-60 | | | | 15-60 | | | | | |
| Precip. (in) NONE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | 10 | 6 | 8 | 6 | 12 | 13 | 12 | 16 | 17 | 16 | 21 | 24 | 24 | 23 | 26 | 27 | 27 | 27 | 23 | 25 | 30 | 24 | | 26 | | | 22 | | | | 12 | | | | | |
| TONOPAH 06A-2-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cela | | | | | | | | | D | LG | | | | | TG | | | | BV | FB | SR | | | | | | | | | | | | | | | | | | | | | | | |
| Arsp | | | | | | | | | LG | | | | | TG | BV | 1B | FB | | BO | | SR | | LY | LD | | | | | | | | | | | | | | | | | | | | |
| Atco ♀ | | | | | | | | | D | LG | | | | | TG | | | | | | 1B | BO | | | | | | | | | | | | | | | | | SR | | | | | |
| ♂ | | | | | | | | | D | LG | | | | | TG | | 1B | FB | | BO | | | | | | | LY | | | | | | | | | | | | | | | | | |
| GRASSES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | GS | | | | | ½V | | | | FS | HO | 1B | HS | | | SD | | BD | PD | | | ½V | | | | | | | | | | | | | | |
| FORBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sphae sp. | | | | | | | | | D | GS | | | | | FS | | | | 1B | FB | BO | | SR | DS | BD | | | | FS | 1B | | FB | | | | | | | BD | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | S-60 | S-60 | S-60 | S-60 | 3-60 | 6-60 | 6-60 | 9-60 | 13-60 | 13-60 | 13-60 | 13-60 | | 20-60 | 20-60 | 25-60 | 25-60 | 25-60 | 1-51 | 4-60 | 46-60 | 3-60 | | 5-24 | | | 20-60 | | | | 4-60 | | | | | |
| Precip. (in) NONE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | 7 | 4 | 4 | 5 | 11 | 13 | 12 | 14 | 17 | 16 | 22 | 21 | 25 | 25 | 26 | 26 | 26 | 26 | 26 | 25 | 29 | 24 | | 25 | | | 22 | | | | 14 | | | | | |
| TONOPAH 06A-2-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Come | | | | | | | | | D | | | | | | | | | LG | TG | BV | 1B | | FB | | | BO | | | SR | SD | | | | | LY | | | | | | | | | |
| Artr | | | | | | | | | D | | | | | | | | LG | | TG | | | | | BV | | | FB | | | | | | | | 1B | | | | SD | | | | | |
| Grsp | | | | | | | | | D | | | LG | | | TG | | 1B | FB | | | BO | | | LY | | | | | | | | | | | | | | | | | | | | |
| Atca | | | | | | | | | D | | | | | | | | | | TG | | BV | | FB | BO | | | LY | | | | | | | | | | | | | | | | | |
| Epne | | | | | | | | | D | | | | | | | | | | | | LG | TG | | | | | | | | | | | | | | | | | | | | | | |
| Pran | | | | | | | | | | | | | | | LG | | 1B | FB | BO | | SR | | | | | SD | LY | | | | | | | | | | | | | | | | | |

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## CARROLL SUMMIT

Squirreltail grass (Sitanion hystrix) seems to confine its phenologic development to no more than a three week spread for each phenotype during the past four years (Figure 1), irrespective of soil moisture depth.

Height growth on crested wheatgrass (Agropyron cristatum) seems to follow very closely all four years until early July, when it either stops growing or spurts quickly, as it did in 1978 to 500 millimeters (Figure 2).

Phenologic stages for Kentucky bluegrass (Poa pratensis) are remarkably similar over the four years (Figure 3). These four years of data would appear to be adequate for determining when this grass arrives at its key stages. Snowberry (Symphoricarpos longiflorus) shows a similar pattern over the four years except for seed ripe in 1978, which occurred a month later (Figure 4).

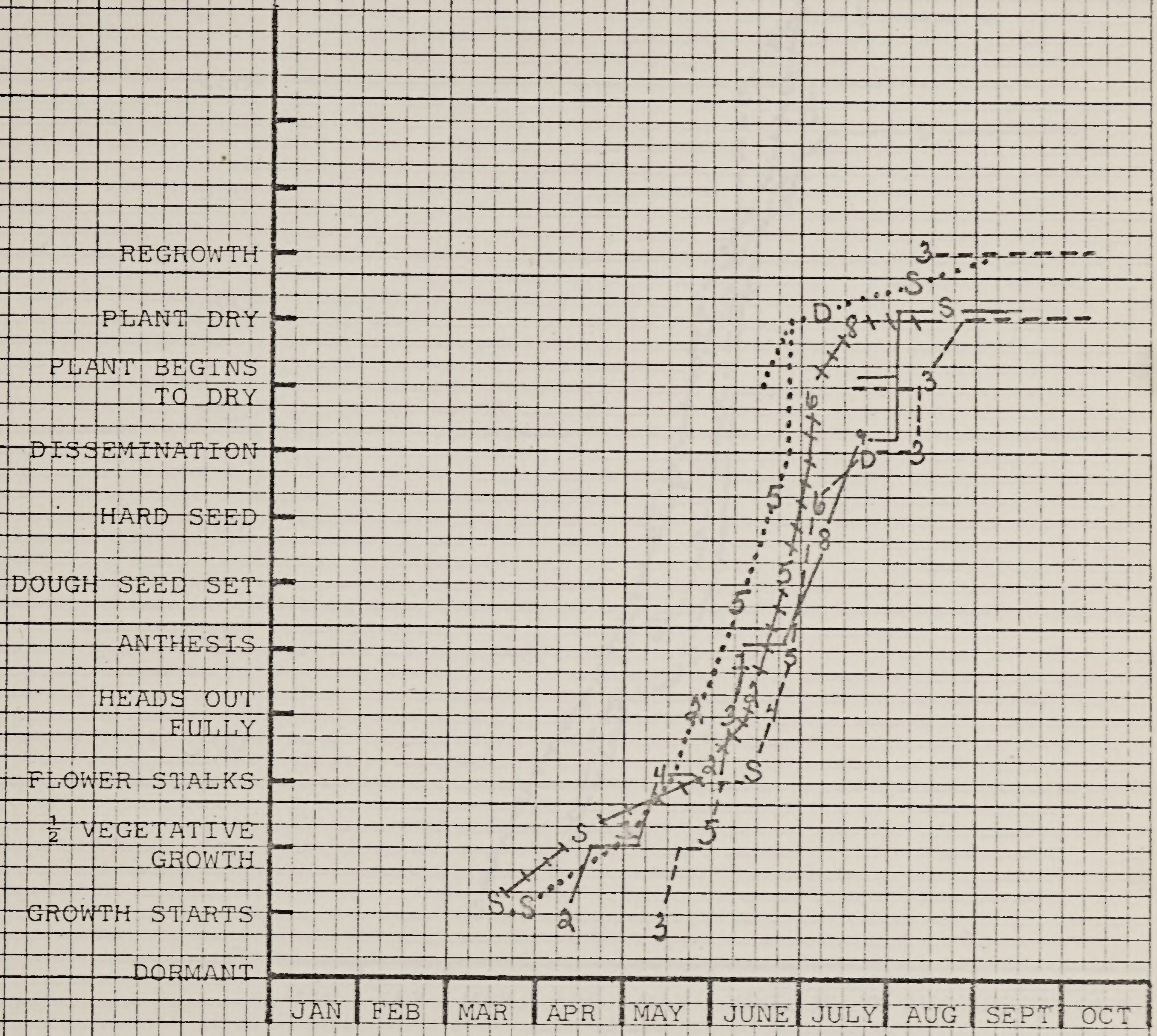
On the other hand, Sandberg's bluegrass (Poa sandbergii) shows much more variation, with up to seven weeks difference for occurrence of one phenotype (Figure 5).

Leader growth of bitterbrush (Purshia tridentata) grew less than one-fourth in 1979 than it did in 1976, while the other two years were in between (Figure 6). In 1976, soil moisture appears to stay relatively close to the surface while it does drop down somewhat in the other years.

While key phenological events for bitterbrush and snowberry are quite similar over the four years, they are very different for desert globemallow (Sphaeralcea ambigua), phlox (Phlox sp.),

Thurber's needlegrass (*Stipa thurberiana*), and crested wheatgrass (Figures 7-9).

Leader growth for shrubs and height growth for forbs and grasses are quite variable over the four years, but show no specific, discernable pattern (Table 1).



1976 — — —
1977 ———
1978 +++++
1979 • • • • • • •

Fig. 1. Occurrence of phenophases of *Sitanion hystrix* as compared to soil moisture depth (inches) in northern desert shrub vegetation (Site 07-3), Carroll Summit.

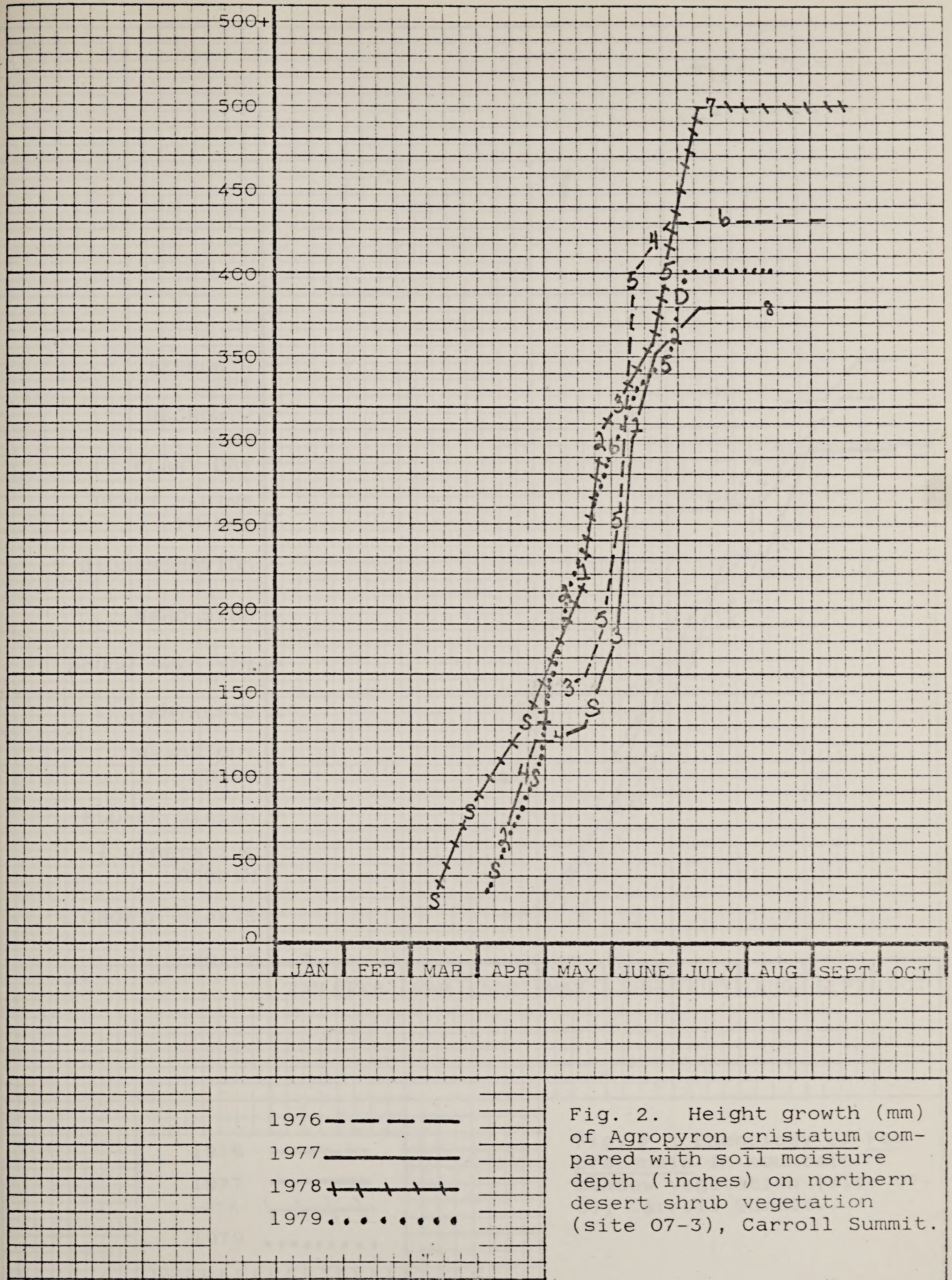


Fig. 2. Height growth (mm) of *Agropyron cristatum* compared with soil moisture depth (inches) on northern desert shrub vegetation (site 07-3), Carroll Summit.

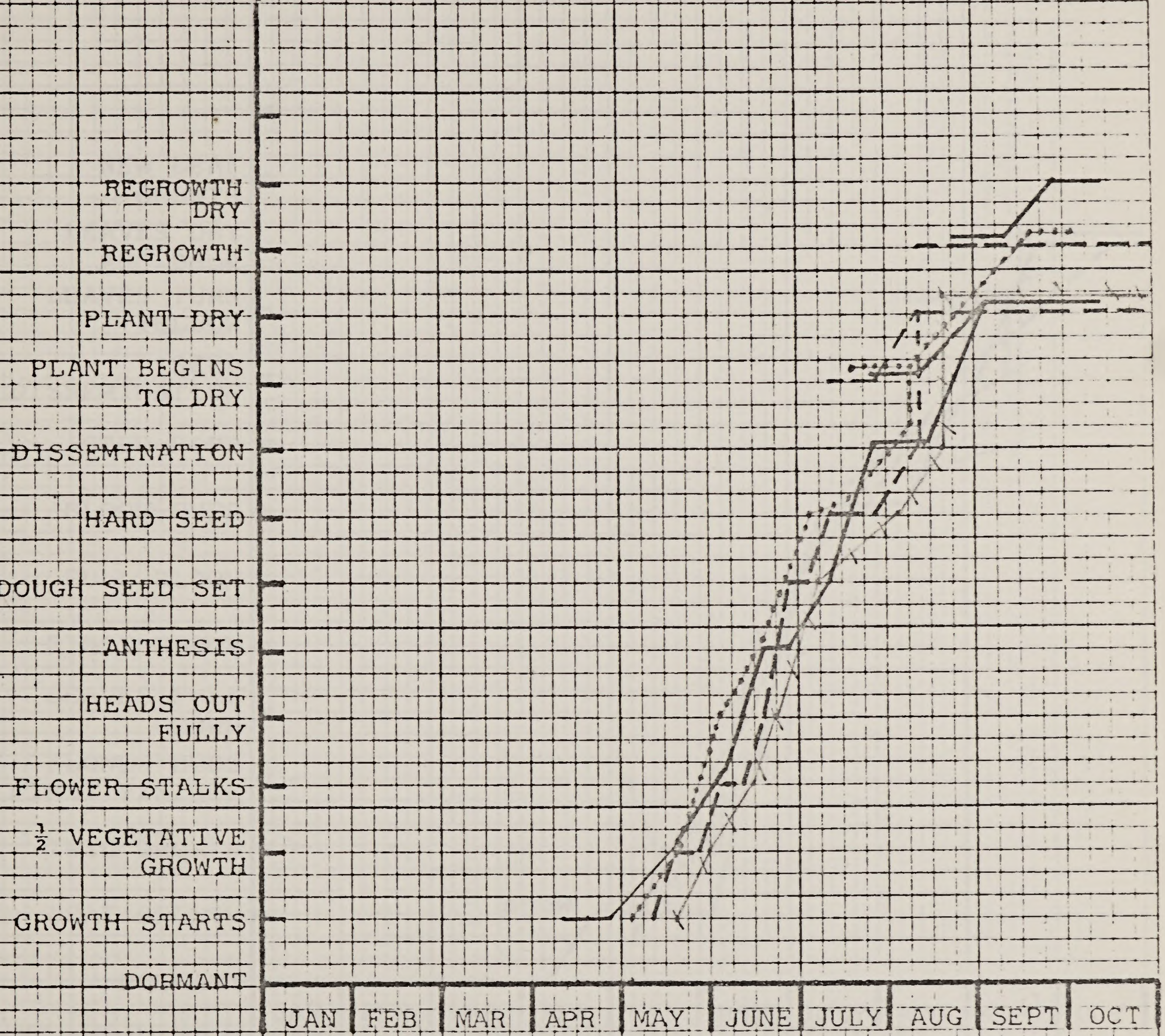


Fig. 3 . Phenology of *Poa pratensis* in mountain meadow vegetation (site 07-6), Carroll Summit.

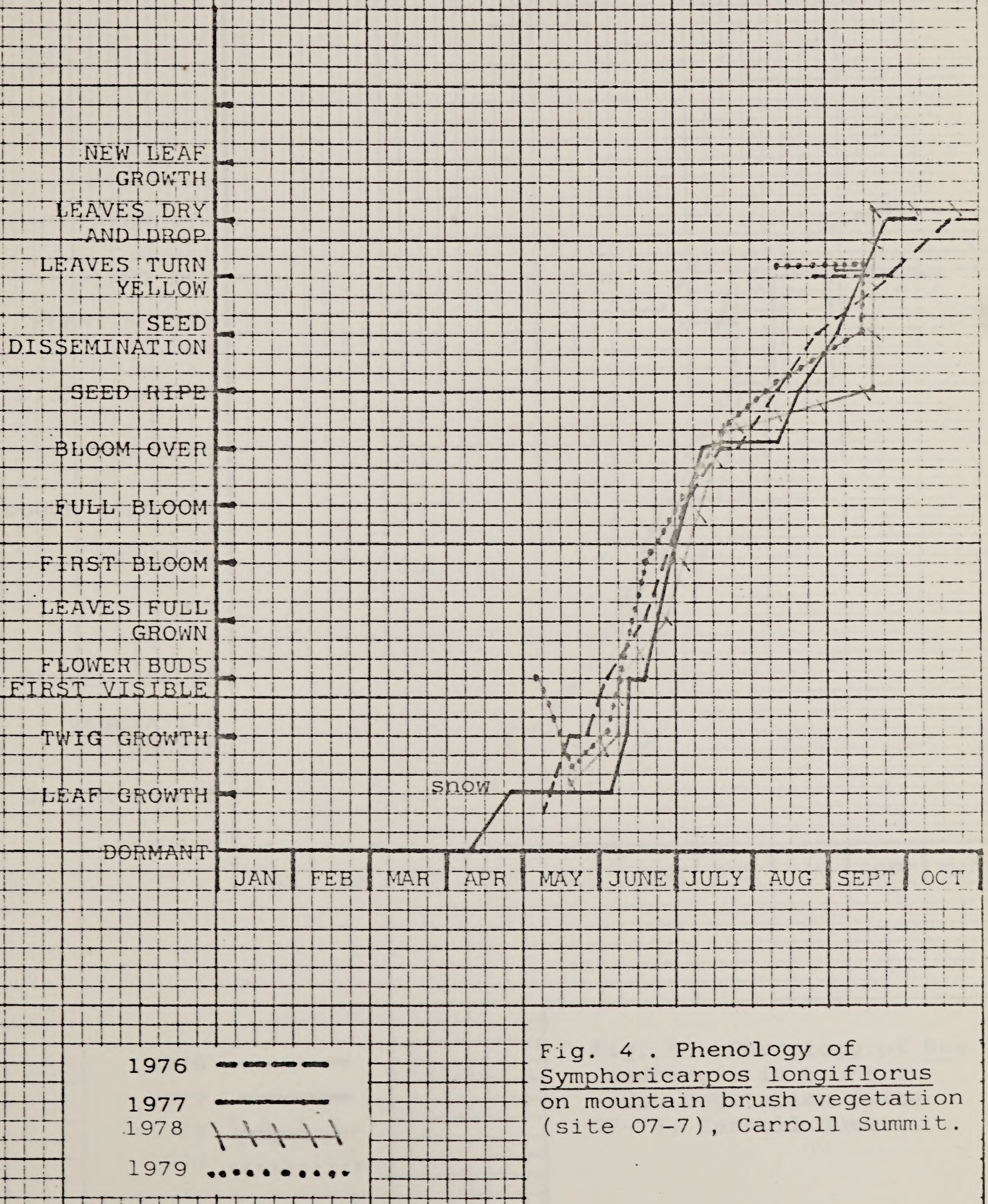


Fig. 4 . Phenology of *Symphoricarpos longiflorus* on mountain brush vegetation (site 07-7), Carroll Summit.

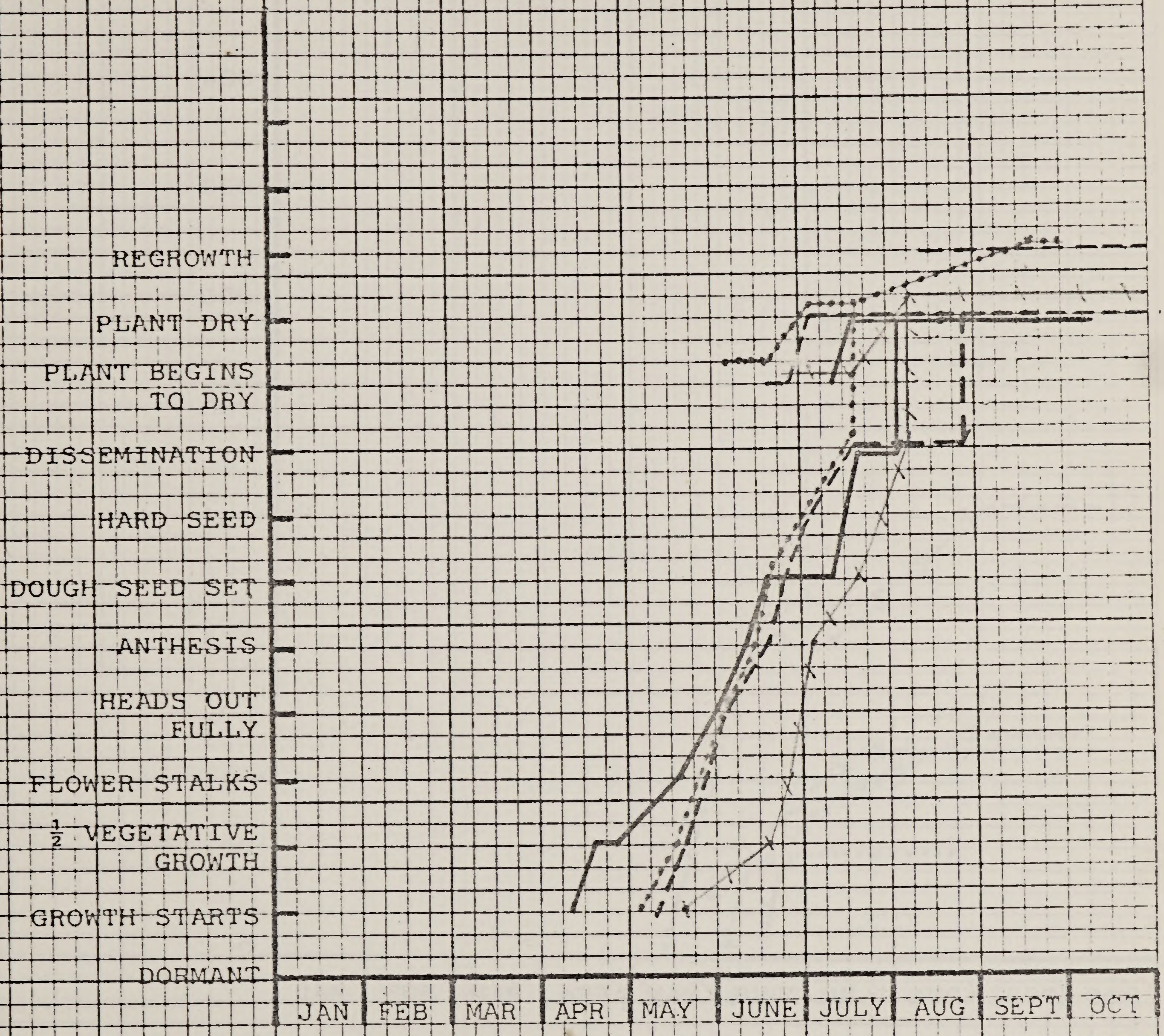


Fig. 5 . Phenology of *Poa sandbergii* in mountain brush vegetation (site 07-7), Carroll Summit.

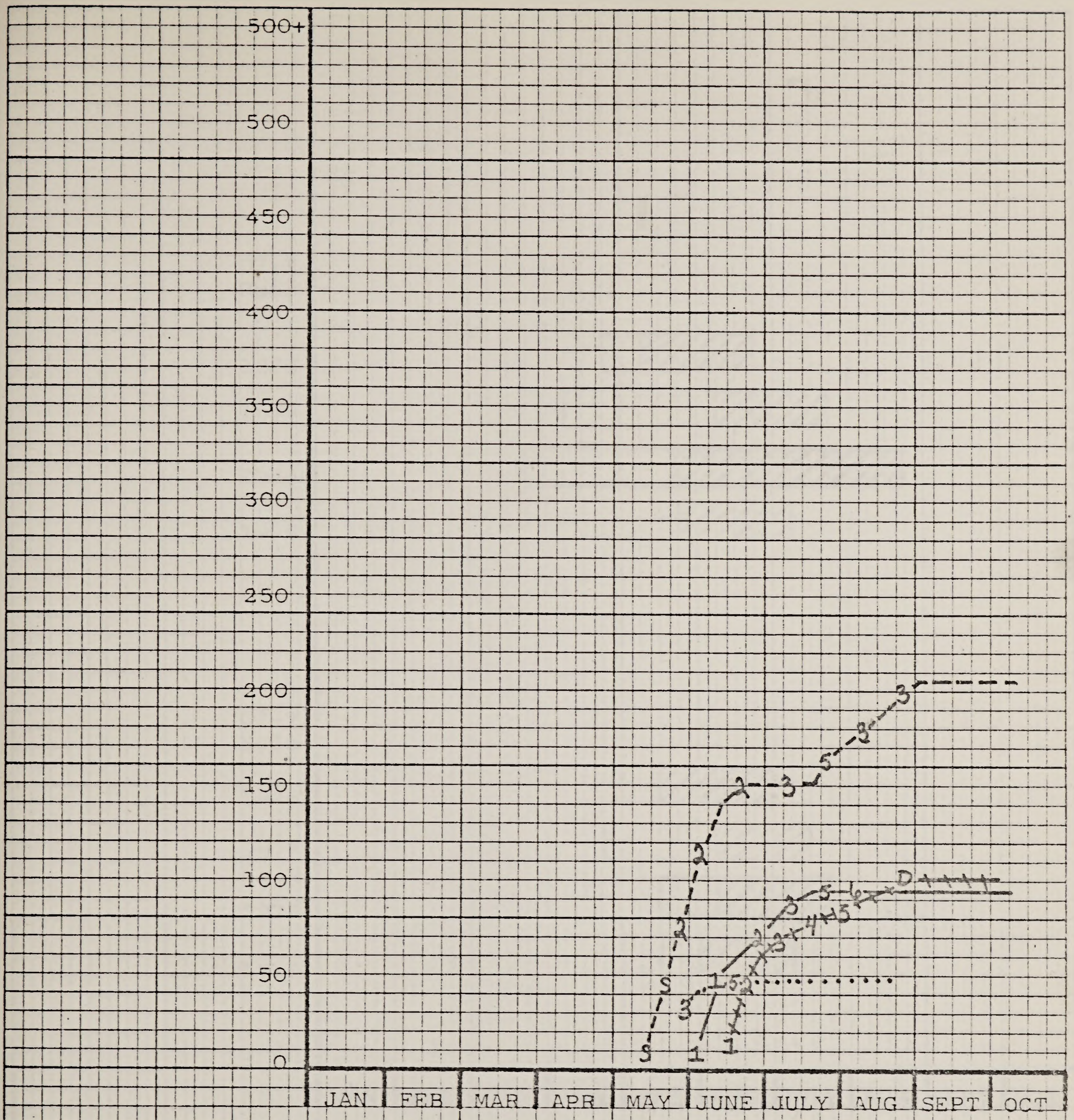


Fig. 6. Leader growth (mm) of *Purshia tridentata* compared to soil moisture depth (inches) in mountain brush vegetation (site 07-7), Carroll Summit.

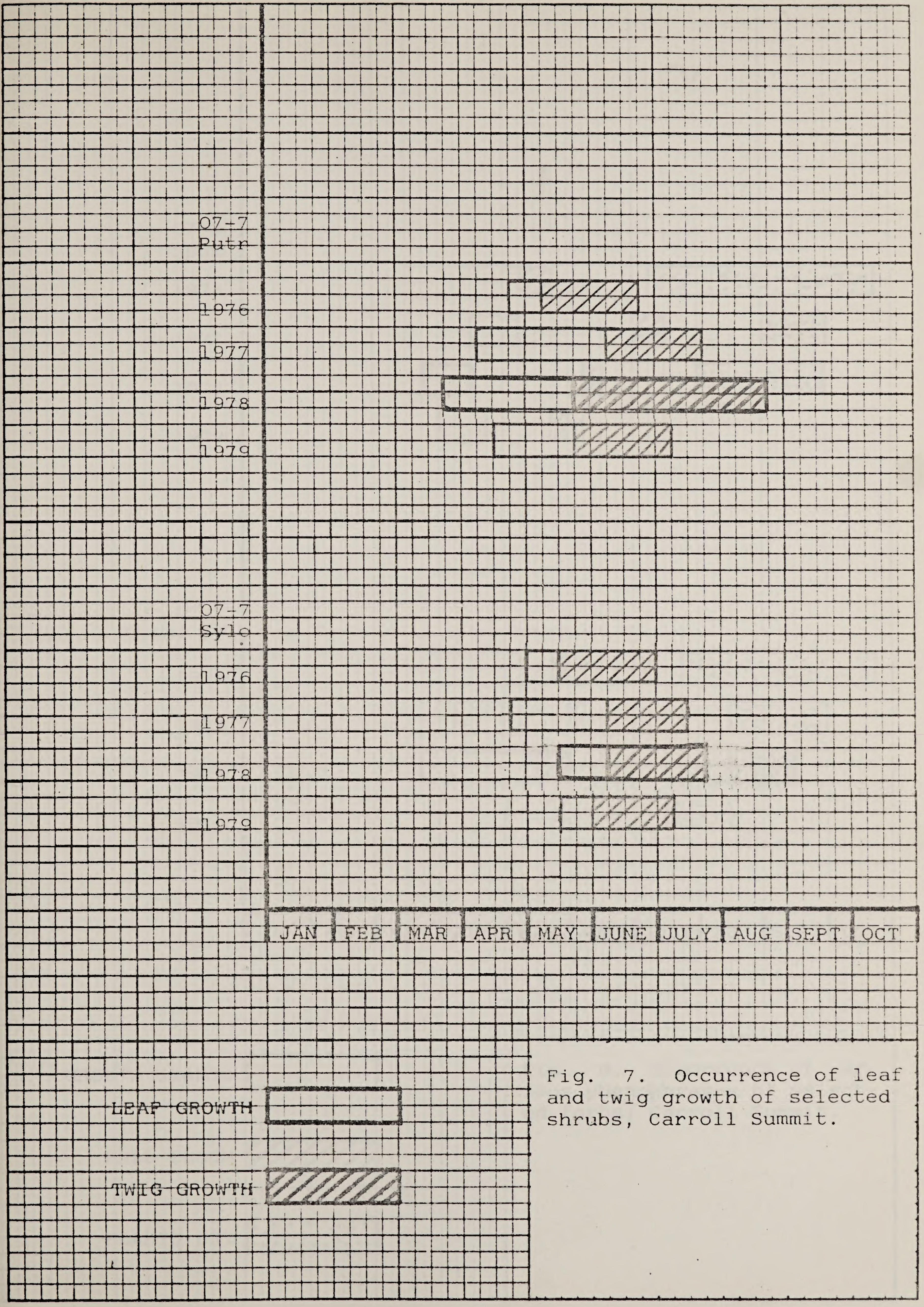


Fig. 7. Occurrence of leaf and twig growth of selected shrubs, Carroll Summit.

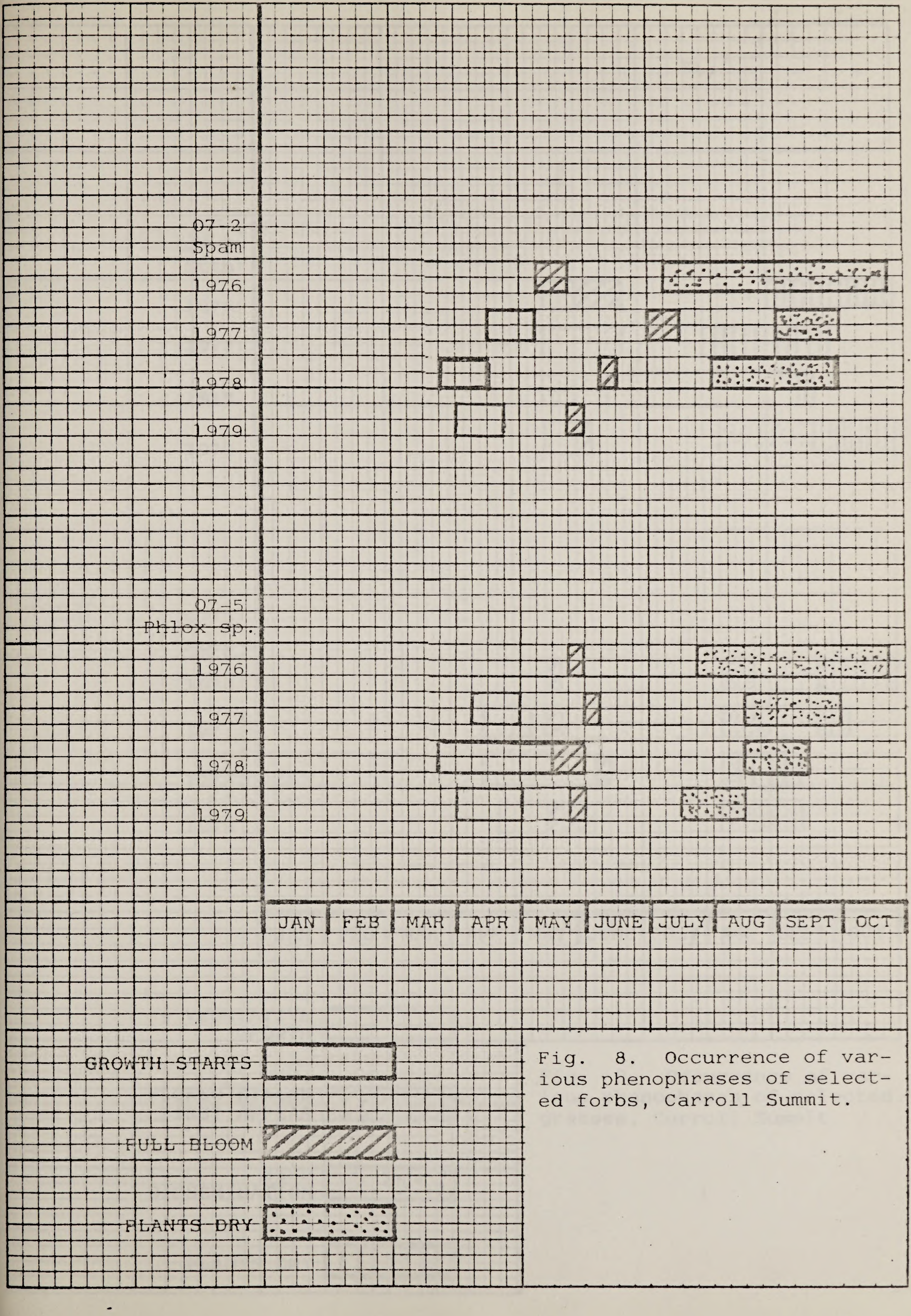


Fig. 8. Occurrence of various phenophrases of selected forbs, Carroll Summit.

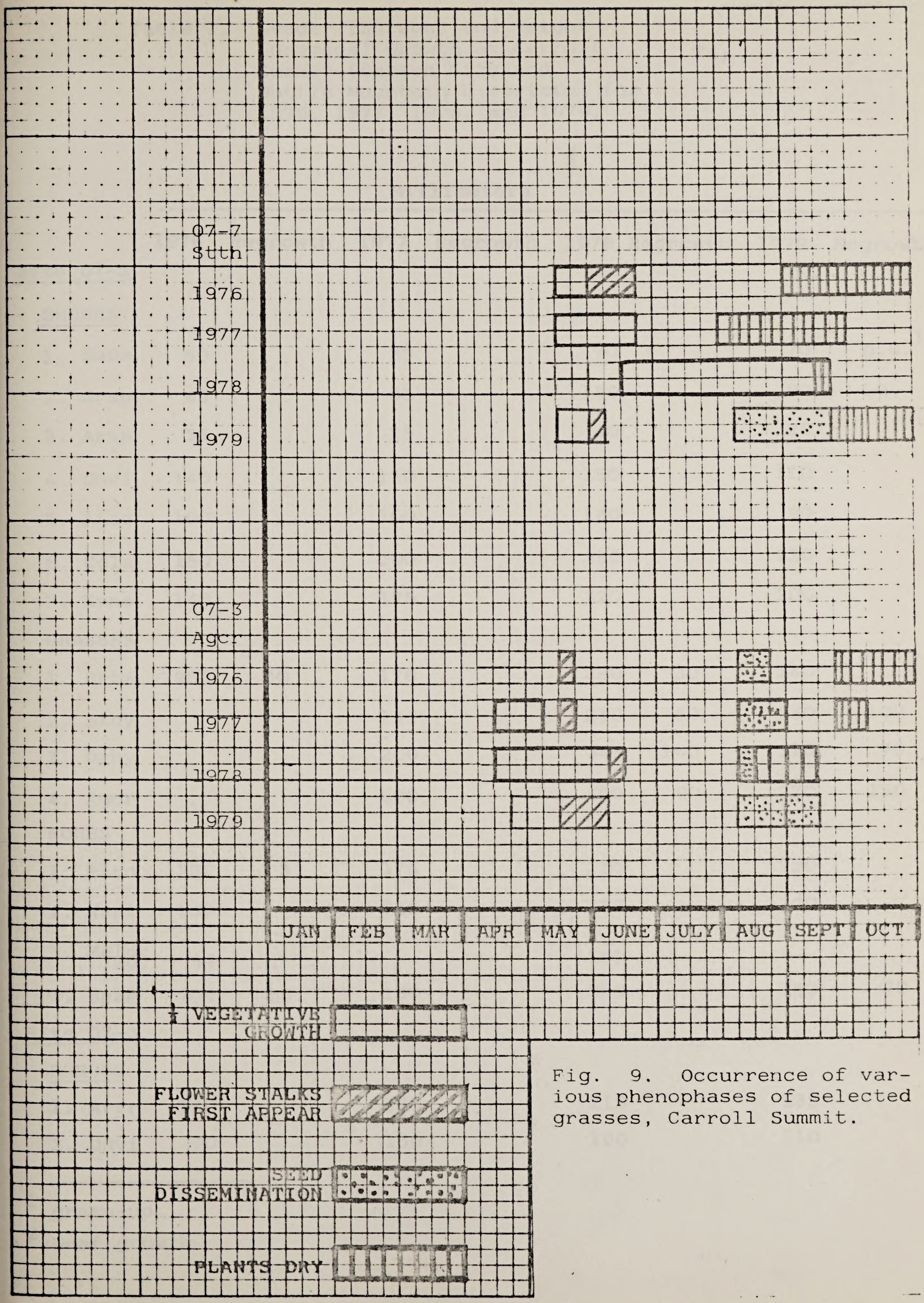


Fig. 9. Occurrence of various phenophases of selected grasses, Carroll Summit.

Table 1. Leader (Shrubs) and Height (Grasses) Growth at Carroll Summit (Carson City and Battle Mountain Districts) for 1976, 1977, 1978, and 1979.

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 07-2 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Saba | 50 | | 35 | | 70 | | 70 | g.u.[1] |
| 2. Grsp | 85 | | 85 | | 150 | | 90 | LG[2] |
| 3. Arsp | 35 | | 25 | | 40 | | 25 | |
| 4. Chvi | 140 | | 120 | | 130 | | 110 | |
| 5. Atco | 100 | | 100 | | 180 | | 90 | |
| 6. Cela | 150 | | 200 | | 250 | | 220 | |
| 7. Epne | 145 | | 175 | | 220 | | 200 | |
| GRASSES | | | | | | | | |
| 1. Brte | 200 | 30 | 170 | | 250 | 30 | 140 | |
| 2. Sihy | | | 140 | | 210 | 60 | 230 | 100 |
| 3. Orhy | | | 200 | | 345 | 140 | 310 | 70 |
| 4. Agcr | | | 500 | | 400 | 90 | 270 | 150 |
| FORBS | | | | | | | | |
| 1. Phra | 250 | 3 | 175 | | 90 | | 220 | |
| 2. Hagl | 130 | | 185 | | 170 | | 120 | |
| 3. Maloc sp. | 90 | | | | 100 | | --- | |
| 4. Spam | 200 | 50 | 180 | | 350 | | 150 | 70 |
| Site 07-3 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 140 | | 170 | | 215 | | 135 | |
| 2. Chvi | 90 | | 130 | | 160 | | 110 | |

---

[1] green-up

[2] Leaf growth

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 07-3 Con't. | | | | | | | | |
| 3. Chna | 180 | | 230 | | 225 | | 210 | |
| 4. Epne | 100 | | 130 | | 145 | | 140 | |
| GRASSES | | | | | | | | |
| 1. Posa | 70 | | 200 | | 230 | 50 | 300 | |
| 2. Brte | 130 | | 150 | | 160 | 35 | 140 | |
| 3. Sihy | 210 | | 180 | | 250 | 110 | 350 | 50 |
| 4. Agcr | 430 | | 380 | | 500 | 140 | 400 | 100 |
| FORBS | | | | | | | | |
| 1. Lomat sp. | 40 | | 20 | | 80 | | 30 | |
| 2. Erci | | | 10 | | 130 | 50 | 45 | |
| 3. Crac | | | | | 95 | | -- | |
| 4. Delph sp. | | | | | 350 | | 100 | |
| Site 07-5 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Artr | 60 | | 150 | | 180 | | 150 | |
| 2. Chvi | 95 | | 160 | | 110 | | 150 | |
| 3. Eriog sp. | 25 | 20 | 90 | | 100 | LG[1] | 90 | |
| GRASSES | | | | | | | | |
| 1. Brte | 150 | 40 | 160 | | 120 | 20 | 120 | |
| 2. Sihy | 170 | 80 | 180 | | 200 | 70 | 185 | 70 |
| 3. Posa | 200 | 50 | 200 | | 245 | 40 | 200 | |
| 4. Stth | 250 | 60 | 170 | | 310 | g.u.[2] | 350 | 70 |
| FORBS | | | | | | | | |
| 1. Phlox sp. | 30 | 4 | 18 | | 20 | 1 | 20 | g.u.[2] |
| 2. Lupin sp. | 130 | | 150 | | 200 | | 200 | |
| 3. Aswh | 30 | | 25 | | 45 | | 15 | |
| 4. Casti sp. | | | | | | | 140 | |

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[1] Leaf growth

[2] green-up

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 07-6 | | | | | | | | |
| GRASSES | | | | | | | | |
| 1. Carex sp. | 120 | | 150 | | 220 | 30 | 150 | 50 |
| 2. Sihy | 400 | 80 | 360 | | 500 | 60 | 450 | 70 |
| 3. Popr | 450 | 80 | 540 | 170 | 600 | 150 | 750 | 250 |
| 4. Posa | | | 360 | | 450 | 160 | 600 | 25 |
| FORBS | | | | | | | | |
| 1. Taof | 15 | | 70 | 70 | 60 | 20 | 100 | regrowth |
| 2. Vipu | 35 | | 45 | | 40 | 12 | 40 | |
| 3. Senec sp. | | | 80 | | 400 | | 350 | |
| 4. Aster sp. | | | 280 | | 310 | | 400 | |
| 5. Aggl | | | 140 | | 90 | | 150 | |
| 6. Libu | | | 150 | | 250 | | 280 | |
| Site 07-7 | | | | | | | | |
| SHRUBS | | | | | | | | |
| 1. Sylo | 150 | | 100 | | 160 | | 110 | |
| 2. Artr | 150 | | 190 | | 170 | | 180 | |
| 3. Rive | 90 | | 230 | | 105 | | 65 | |
| 4. Chvi | 110 | | 100 | | 200 | | 115 | |
| 5. Putr | 150 | 55 | 95 | | 90 | | 45 | g.u.* |
| GRASSES | | | | | | | | |
| 1. Posa | 300 | 60 | 350 | | 310 | 80 | 330 | 25 |
| 2. Stth | 250 | 50 | 140 | | 160 | | 340 | |
| 3. Sihy | 180 | 60 | 250 | | 330 | 30 | 75 | |
| FORBS | | | | | | | | |
| 1. Vipu | 35 | | 20 | | 35 | 8 | 23 | |

---

* green-up

| | Millimeters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1976 | Regrowth | 1977 | Regrowth | 1978 | Regrowth | 1979 | Regrowth |
| Site 07-7 Con't. | | | | | | | | |
| 2. Lupin sp. | 110 | | 70 | | 130gr.* | | 210 | |
| 3. Liliu sp. | | | 280 | | 100gr.* | | 240gr.* | |
| 4. Phlox sp. | 35 | | 20 | 3 | 28 | | 25 | |
| 5. Senec sp. | 60 | | 50 | | 70 | | 290 | |
| 6. Libu | 20 | | | | -- | | 10 | |
| 7. Aggl | 150 | | 45 | | 70 | | 100 | |

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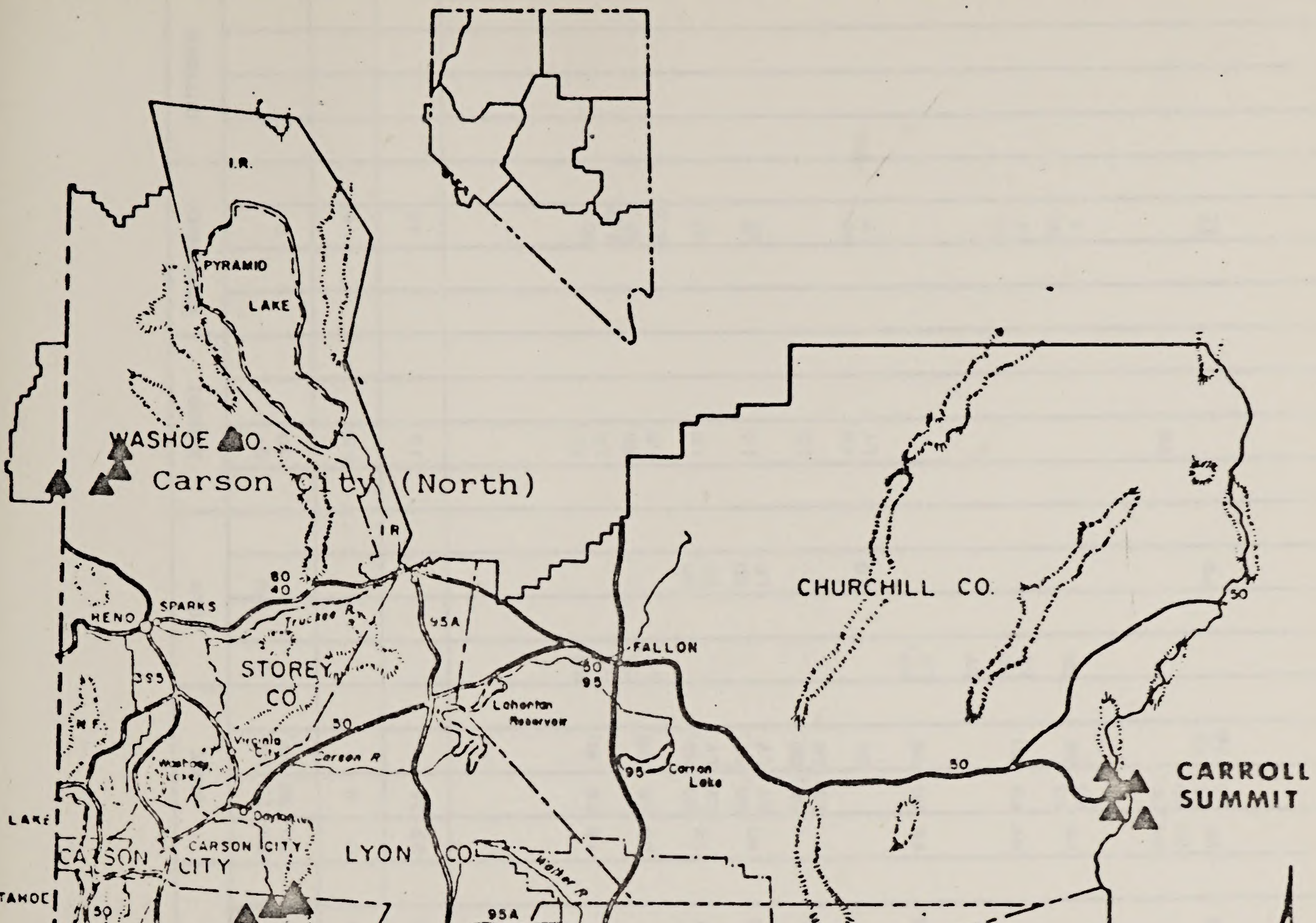
* grazed



▲ SITE LOCATIONS
(Not all sites shown due
to closeness)

# CARSON CITY DISTRICT

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S-30 | | S-30 | | 2-30 | S-30 | 5-30 | 1-30 | 6-30 | | 15-30 | 23-30 | 18-30 | | D | | D | | | S-30 | | | | | D | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | .39 | 0 | .37 | 0 | | 0 | 0 | | | | | | | | 2.54 | | | | | .6 | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | 12 | | 21 | 13 | 26 | | 29 | 28 | | | | | | | | 12 | | | | | 16 | | | | | | | | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Saba ♀ | | | | | | | | | | | D | | | | LG | BV | | TG | | | 1B | FB | BO | | BD, LY | | | | | SD, LD | | | | | SD, g.u | | | | | | | | | |
| ♂ | | | | | | | | | | | D | | | | LG | BV | | TG | | | BO | SR | SD | | SD, LY | | | | | SD, LD | | | | | SD, g.u | | | | | | | | | |
| Grsp ♀ | | | | | | | | | | | D | | LG | | | TG | | | BV | | 1B | BO, LY | SD, LY | | | | SD, LD | | | LD | | | | | LG | | | | | | | | | |
| ♂ | | | | | | | | | | | D | | LG | | | TG, BV | | FG | 1B | | BO | SR, LY | SD, LY | | | | SD, LD | | | LD | | | | | LG | | | | | | | | | |
| Arsp | | | | | | | | | | | LG | | TG | | BV | | 1B | FB | BO | | | SD, LY | SD, LD | | | | | | | LD | | | | | | | | | | | | | | |
| Chvi | | | | | | | | | | | LG | | | | | TG | | | | | | | BV | | | | FG | | | FB, LY | | | | | BO, LY | | | | | | | | | |
| Atco ♀ | | | | | | | | | | | D | | LG | | | TG | BV | | FG | | FB | BO | SR | | SD, LY | | | | | | | | | | | | | | | | | | | |
| ♂ | | | | | | | | | | | D | | LG | | | TG | | | | | | | | | LY | | | | | | | | | | | | | | | | | | | |
| Cela | | | | | | | | | | | D | | LG | | | | | TG | | | BV | FB | BO | | BO, LY | | | | | | | | | | SD, LY | | | | | | | | | |
| Epne | | | | | | | | | | | D | | | | | | | BV | | | FB | TG, BO | SR | | SD | | | | | | | | | | SD, LY | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | D | | GS | | | ½V | FS | HO | | | HS, BD | SD, PD | | | | | | | | PD | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | | | | ½V | | | FS | | DS | HS, BD | SD, PD | | | | PD | | | | | | | | ½V | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07-2 Con't. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orhy | | | | | | | | | | | GS | | | | | $\frac{1}{2}$V | | | FS | | DS | HS | SD,<br>BD | | | | PD | | | | | | | | $\frac{1}{2}$V | | | | | | | | | |
| Agcr | | | | | | | | | | | D | | GS | | | $\frac{1}{2}$V | | | FS | | HO | An | | | DS | | HS,<br>BD | | | SD,<br>BD | | | | | $\frac{1}{2}$V | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phra | | | | | | | | | | | D | | GS | | | | FS | | 1B | | BO,<br>BD | SR,<br>BD | | | DS,<br>PD | | | | | PD | | | | | | | | | | | | | | |
| Hagl | | | | | | | | | | | D | | | | | | | | GS | | | | | | | | | | | | | | | | FB | | | | | | | | | |
| Spam | | | | | | | | | | | D | | GS | | | FS | | | | | BO | SR | DS | | DS,<br>BD | | BD | | | GS | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S-30 | | S-30 | | 2-30 | S-30 | 4-30 | 1-30 | 5-30 | | 14-30 | 21-30 | 13-30 | | D | | D | | | S-30 | | | | | D | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | .3 | 0 | .64 | 0 | | 0 | 0 | | | | | | | | 1.75 | | | | | 0 | | | | | | | | | |
| S.T.-°C | | | | | | | | | | | | | | | 15 | | 21 | 20 | 26 | | 24 | 24 | | | | | | | | 12 | | | | | 16 | | | | | | | | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | LG | | | | | | TG | | | | | | | | BV | | | | | FG | | | | | FB | | | | | | | | | |
| Chvi | | | | | | | | | | | D | | LG | | | | TG | | | | | | | | BV | | | | | FB | | | | | BO | | | | | | | | | |
| Chna | | | | | | | | | | | D | | | | LG | | | | | | TG | | | | | | BV | | | | | | | | FB | | | | | | | | | |
| Epne | | | | | | | | | | | D | | | | | | | | | | | | TG | | | | | | | | | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | | GS | | | | | ½V | FS | HO | | | DS<br>BD | HS,<br>PD | SD,<br>PD | | | | | | | PD | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | D | | GS | | | ½V | FS | | HO | | DS<br>BD | HS,<br>PD | SD,<br>PD | | | | | | | PD | | | | | | | | | | | | | | |
| Sihy | | | | | | | | | | | GS | | | | | | ½V | | FS | | An | DS | HS,<br>BD | | SD,<br>PD | | PD | | | | | | | | GS | | | | | | | | | |
| Agcr | | | | | | | | | | | D | | GS | | | ½V | | | FS | | | HO | An | | DS | | HS,<br>BD | | | SD<br>BD | | | | | GS | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lomat sp. | | | | | | | | | | | GS | | | | FS | 1B | FB | BO | | | PD | | | | | | | | | | | | | | | | | | | | | | | |
| Erci | | | | | | | | | | | D | | GS | | | FS | IB | | FB | | SR,<br>BD | SD,<br>PD | PD | | | | | | | | | | | | | | | | | | | | | |
| Delph sp. | | | | | | | | | | | D | | GS | | | | FS | | | | PD | | | | | | | | | | | | | | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | S-30 | | S-30 | | 2-30 | S-30 | 4-30 | S-30 | 3-30 | | 9-30 | 18-30 | 7-30 | |
| Precip. (in) | | | | | | | | | | | | | | | | | 0 | .94 | 0 | | 0 | 0 | | |
| S.T.-°C | | | | | | | | | | | | | | | 11 | | 20 | 16 | 23 | | 23 | 22 | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | | | | | |
| 07-5 | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | |
| Artr | | | | | | | | | | | D | | LG | | | | | | TG | | | | | |
| Chvi | | | | | | | | | | | D | | LG | | | | | TG | | | | | | |
| Eriog sp. | | | | | | | | | | | D | | LG | | | | | | TG, BV | | 1B | FB | SR | |
| Eriog sp. | | | | | | | | | | | D | | LG | | | | TG, BV | | | | FB | BO | SR | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | |
| Brte | | | | | | | | | | | D | | GS | | | | ½V | FS | | | HO | An, BD | DS, BD | |
| Sihy | | | | | | | | | | | GS | | | | | | ½V | | | | FS | HO | An | |
| Posa | | | | | | | | | | | D | | GS | | | ½V | FS | | HO | | An, BD | DS, BD | SD, PD | |
| Stipa sp. | | | | | | | | | | | GS | | | | | | ½V | | | | HO | An | DS, BD | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | |
| Phlox sp. | | | | | | | | | | | D | | GS | | | | FS | 1B | | | BO | SR | DS, BD | |
| Lupin sp. | | | | | | | | | | | D | | | | GS | | | | FS | | 1B | BO | DS, BD | |
| Aswh | | | | | | | | | | | D | | | | GS | | | | | | BD | | PD | |
| Casti sp. | | | | | | | | | | | D | | | | | | GS | | FS | | 1B | FB | | |

| SYMBOL 1979 | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | 12-30 | D | | | | S-30 | | | | S-5. | | | | | | | | | | |
| Precip. (in) | | 0 | | | | 355 | | | | .75 | | | | | | | | | | |
| S.T.-°C | | | | | | 12 | | | | 12 | | | | | | | | | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | |
| 07-5 | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | |
| Artr | BV | | | | | FG | | | | FB, BO | | | | | | | | | | |
| Chvi | BV | | | | | FB | | | | BO, SR | | | | | | | | | | |
| Eriog sp. | SD | SD, LY | | | | | | | | SD, g.u. | | | | | | | | | | |
| Eriog sp. | SD | SD, LY | | | | | | | | SD, g.u. | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | |
| Brte | HS, PD | SD, PD | | | | | | | | PD | | | | | | | | | | |
| Sihy | HS | SD, BD | | | | GS | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | PD | | | | | | | | | | |
| Stipa sp. | HS, BD | SD, PD | | | | GS | | | | | | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | |
| Phlox sp. | BD | PD | | | | g.u. | | | | BD | | | | | | | | | | |
| Lupin sp. | | | | | | BD | | | | PD | | | | | | | | | | |
| Aswh | | | | | | | | | | | | | | | | | | | | |
| Casti sp. | BO, BD | | | | | DS, PD | | | | PD | | | | | | | | | | |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | S-30 | | S-30 | | 7-30 | 12-30 | 4-30 | | 7-30 | | 12-30 | | | S-30 | | | | | S-5. | | | | | | | | | |
| Precip. (in) | | | | | | | | | | | | | | | | | | | .76 | | 0 | | .25 | | | | 0 | | | 3. | | | | | | | | | | | | | | |
| S.T.-°C | | | | | | | | | | | | | | | | | 12 | | 15 | | 25 | 26 | 22 | | | | | | | 11 | | | | | 4 | | | | | | | | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | --- | --- | --- | --- | --- | --- | --- | S | N | O | W | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carex sp. | | | | | | | | | | | | | | | | | GS | | ½V | | An | | | | HS | | HS,<br>BD | | | SD,<br>BD | | | | | ½V | | | | | | | | | |
| Sihy | | | | | | | | | | | | | | | | | GS | | ½V | | | FS | | | HO | | DS | | | SD,<br>BD | | | | | GS | | | | | | | | | |
| Popr | | | | | | | | | | | | | | | | | GS | | ½V | | HO | | An | | HS | | HS,<br>BD | | | SD,<br>BD | | | | | ½V | | | | | | | | | |
| Posa | | | | | | | | | | | | | | | | | GS | | ½V | | HO | An | DS | | HS | | HS,<br>BD | | | SD,<br>BD | | | | | GS | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Taof | | | | | | | | | | | | | | | | | GS | | FS | | FB | SR | DS | | | | | | | | | | | | BO,<br>SR | | | | | | | | | |
| Vipu | | | | | | | | | | | | | | | | | GS | | 1B | | FB | SR | DS | | | | | | | | | | | | PD | | | | | | | | | |
| Senec sp. | | | | | | | | | | | | | | | | | GS | | 1B | | FB | BO | gr. | | | | | | | | | | | | | | | | | | | | | |
| Libu | | | | | | | | | | | | | | | | | GS | | FS | | FB | BO,<br>BD | SR,<br>PD | | SD,<br>PD | | PD | | | | | | | | | | | | | | | | | |
| Aggl | | | | | | | | | | | | | | | | | GS | | | | 1B | BO | BO,<br>BD | | SR,<br>PD | | DS<br>PD | | | PD | | | | | | | | | | | | | | |
| Aster sp. | | | | | | | | | | | | | | | | | D | | | | | | | | | | FS | | | FB | | | | | BO | | | | | | | | | |

| SYMBOL 1979 | JAN |  |  |  | FEB |  |  |  | MARCH |  |  |  | APRIL |  |  |  | MAY |  |  |  | JUNE |  |  |  | JULY |  |  |  | AUGUST |  |  |  | SEPTEMBER |  |  |  | OCTOBER |  |  |  | NOVEMBER |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Precip. (   ) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S.T.-$^{o}$C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CARROLL SUMMIT |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 07-7 Con't. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Phlox sp. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | GS |  |  |  | 1B | FB | BO |  | SR |  | DS, BD |  |  | BD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Senec sp. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | GS |  | FS |  | 1B | FB | gr |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Aggl |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | D |  |  |  | GS |  |  |  | BD |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Libu |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | D |  | GS |  | PD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| SYMBOL 1979 | JAN | | | | FEB | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | | JULY | | | | AUGUST | | | | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMD (From-To in cm) | | | | | | | | | | | | | | | | | S-30 | | S-30 | | 8-30 | 11-30 | 5-30 | | 9-30 | | 15-30 | | | S-30 | | | | | S-7. | | | | | | | | | |
| Precip. ( ) | | | | | | | | | | | | | | | | | THIS SITE IS IN CLOSE PROXIMITY TO 07-6, SO SMD, TEMPERATURE, AND | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.T.-$^{o}$C | | | | | | | | | | | | | | | | | PRECIPITATION ARE THE SAME AS FOR 07-6. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CARROLL SUMMIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHRUBS | ------ | ------ | ------ | ------ | ------ | ------ | ------ | S | N | O | W | ------ | ------ | ------ | ------ | ------ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sylo | | | | | | | | | | | | | | | | | BV | | LG,<br>BV | | TG | | 1B | | FB | | BO | | | SR,<br>LY | | | | | SD<br>LY | | | | | | | | | |
| Artr | | | | | | | | | | | | | | | | | LG | | | | TG | | | | | | BV | | | FG | | | | | FB | | | | | | | | | |
| Rive | | | | | | | | | | | | | | | | | LG,<br>BV | | | | TG,<br>FB | BO | | | | | | | | SR,<br>LY | | | | | SD<br>LY | | | | | | | | | |
| Chvi | | | | | | | | | | | | | | | | | D | | LG | | TG | | | | | | BV | | | 1B | | | | | FB<br>BO | | | | | | | | | |
| Putr | | | | | | | | | | | | | | | | | LG | | | | TG,<br>FB | BO | | | | | SR | | | SD,<br>LY | | | | | SD<br>g.u. | | | | | | | | | |
| GRASSES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Posa | | | | | | | | | | | | | | | | | GS | | ½V | | HO,<br>BD | An,<br>BD | DS,<br>BD | | HS,<br>PD | | SD,<br>PD | | | | | | | | GS | | | | | | | | | |
| Stth | | | | | | | | | | | | | | | | | GS | | ½V | | FS | HO | | | An | | HS,<br>BD | | | SD,<br>BD | | | | | PD | | | | | | | | | |
| Sihy | | | | | | | | | | | | | | | | | GS | | ½V | | | FS | | | HO | | DS,<br>BD | | | SD,<br>PD | | | | | ½V | | | | | | | | | |
| FORBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vipu | | | | | | | | | | | | | | | | | GS | | | | | | | | BD | | PD | | | | | | | | | | | | | | | | | |
| Lupin sp. | | | | | | | | | | | | | | | | | GS | | | | | FS | 1B | | BO | | SR | | | BD | | | | | | | | | | | | | | |
| Liliu sp. | | | | | | | | | | | | | | | | | GS | | | | FS | | | | gr | | | | | | | | | | | | | | | | | | | |

## Appendix I. Symbol and scientific name (alphabetically by symbol) of species presented in phenodynamic tables.

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| SHRUBS: | |
| Amal | Amelanchier alnifolia |
| Amdu | Ambrosia dumosa |
| Amut | Amelanchier utahensis |
| Arar | Artemisia arbuscula |
| Arno | Artemisia nova |
| Arpa | Arctostaphylos patula |
| Arsp | Artemisia spinescens |
| Artr | Artemisia tridentata |
| Atca | Atriplex canescens |
| Atco | Atriplex confertifolia |
| Atle | Atriplex lentiformis |
| Bere | Berberis repens |
| Cegr | Ceanothus greggii |
| Cela | Ceratoides lanata |
| Cele | Cercocarpus ledifolius |
| Cepr | Ceanothus prostratus |
| Ceve | Ceanothus velutinus |
| Chna | Chrysothamnus nauseosus |
| Chvi | Chrysothamnus viscidiflorus |
| Come | Cowania mexicana |
| Cora | Coleogyne ramosissima |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Cost | Cowania stansburiana |
| Dafr | Dalea fremontii |
| Epne | Ephedra nevadensis |
| Epvi | Ephedra viridis |
| Eriog sp. | Eriogonum |
| Grsp | Grayia spinosa |
| Haco | Haplopappus cooperi |
| Hodi | Holodiscus discolor |
| Hodu | Holodiscus dumosus |
| Juos | Juniperus osteosperma |
| Krpa | Krameria parvifolia |
| Ladi | Larrea divaricata |
| Lepu | Leptodactylon pungens |
| Lysp | Lygodesmia spinosa |
| Mare | Mahonia repens |
| Potr | Populus tremuloides |
| Potr3 | Populus trichocarpa |
| Pran | Prunus andersonii |
| Prju | Prosopis juliflora |
| Prvi | Prunus virginiana |
| Putr | Purshia tridentata |
| Riau | Ribes aureum |
| Ribes sp. | Ribes |
| Rice | Ribes cereum |
| Rive | Ribes velutinum |
| Rosa sp. | Rosa |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Rowo | *Rosa woodsii* |
| Saal | *Salix alba* |
| Saba | *Sarcobatus baileyi* |
| Saca | *Salix cascadensis* |
| Salix sp. | *Salix* |
| Save | *Sarcobatus vermiculatus* |
| Syal | *Symphoricarpos albus* |
| Sylo | *Symphoricarpos longiflorus* |
| Symph sp. | *Symphoricarpos* |
| Syoc | *Symphoricarpos occidentalis* |
| Teca | *Tetradymia canescens* |
| Tegl | *Tetradymia glabrata* |
| Yubr | *Yucca brevifolia* |
| | |
| GRASSES: | |
| Agal | *Agrostis alba* |
| Agcr | *Agropyron cristatum* |
| Agda | *Agropyron dasystachyum* |
| Agde | *Agropyron desertorum* |
| Agin Ag | *Agropyron intermedium* |
| Agrop sp. | *Agropyron* |
| Agros sp. | *Agrostis* |
| Agsm | *Agropyron smithii* |
| Agsp | *Agropyron spicatum* |
| Agst | *Agrostis stolinifera* |
| Agtr | *Agropyron trachycaulum* |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Bogr | Bouteloua gracilis |
| Brca | Bromus carinatus |
| Brin | Bromus inermis |
| Brja | Bromus japonicus |
| Brte | Bromus tectorum |
| Cane | Calamagrostis neglecta |
| Carex sp. | Carex |
| Deca | Deschampsia caespitosa |
| Disti sp. | Distichlis |
| Dist | Distichlis stricta |
| Elci | Elymus cinereus |
| Eltr | Elymus triticoides |
| Feid | Festuca idahoensis |
| Feme | Festuca megalura |
| Hija | Hilaria jamesii |
| Hiri | Hilaria rigida |
| Hobr | Hordeum brachyantherum |
| Juba | Juncus balticus |
| Juncu sp. | Juncus |
| Kocr | Koeleria cristata |
| Muri | Muhlenbergia richardsonis |
| Orhy | Oryzopsis hymenoides |
| Orwe | Oryzopsis webberi |
| Poam | Poa ampla |
| Pobu | Poa bulbosa |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Pocu | *Poa cusickii* |
| Pofe | *Poa fendleriana* |
| Pone | *Poa nevadensis* |
| Popr | *Poa pratensis* |
| Posa | *Poa sandbergii* |
| Pule | *Puccinellia lemmoni* |
| Sece | *Secale cereale* |
| Sihy | *Sitanion hystrix* |
| Spai | *Sporobolus airoides* |
| Stco | *Stipa comata* |
| Stipa sp. | *Stipa* |
| Stth | *Stipa thurberiana* |
| Stwe | *Stipa webberi* |
| FORBS: | |
| Acca | *Aconitum columbianum* |
| Acla | *Achillea lanulosa* |
| Acmi | *Achillea millefolium* |
| Aggl | *Agoseris glauca* |
| Alliu sp. | *Allium* |
| Arabi sp. | *Arabis* |
| Argem sp. | *Argemone* |
| Arlu | *Artemisia ludoviciana* |
| Asle | *Astragalus lemmonii* |
| Aster sp. | *Aster* |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Astra sp. | Astragalus |
| Aswh | Astragalus whitneyi |
| Basa | Balsamorhiza sagittata |
| Casti sp. | Castilleja |
| Cirsi sp. | Cirsium |
| Clema sp. | Clematis |
| Crac | Crepis acuminata |
| Delph sp. | Delphinium |
| Erci | Eriodium cicutarium |
| Eriog sp. | Eriogonum |
| Erca | Eriogonum caespitosum |
| Erov | Eriogonum ovalifolium |
| Erth | Eriogonum thomasii |
| Fraga sp. | Fragaria |
| Haar | Haplopappus armerioides |
| Hagl | Halogeton glomeratus |
| Halog sp. | Halogeton |
| Haplo sp. | Haplopappus |
| Hyca | Hydrophyllum capitatum |
| Iris sp. | Iris |
| Irmi | Iris missouriensis |
| Lepe | Lepidium perfoliatum |
| Libu | Lithophragma bulbifera |
| Liliu sp. | Lilium |
| Logr | Lomatium grayi |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Lomat sp. | Lomatium |
| Lone | Lomatium nevadense |
| Lotr | Lomatium triternatum |
| Luca | Lupinus caudatus |
| Lule | Lupinus leucophyllus |
| Lupin sp. | Lupinus |
| Lysp | Lygodesmia spinosa |
| Maca | Machaeranthera canescens |
| Maloc sp. | Malocathrix |
| Mear | Mentha arvensis |
| Meob | Mertensia oblongifolia |
| Merte sp. | Mertensia |
| Mesa | Medicago sativa |
| Migu | Mimulus guttatus |
| Onobr sp. | Onobrychis |
| Peki | Penstemon kingii |
| Penst sp. | Penstemon |
| Pepa | Penstemon palmeri |
| Pesi | Pediocactus simpsoni |
| Phace sp. | Phacelia |
| Phho | Phlox hoodii |
| Phlo | Phlox longifolia |
| Phlox sp. | Phlox |
| Phmu | Phacelia mustelina |
| Phra | Phacelia ramosissima |
| Plma | Plantago major |

| SYMBOL | SCIENTIFIC NAME |
|---|---|
| Popa | Potentilla pacifica |
| Poten sp. | Potentilla |
| Ragl | Ranunculus glaberrimus |
| Ranun sp. | Ranunculus |
| Rate | Ranunculus testiculatus |
| Rumex sp. | Rumex |
| Saka Salsola | Salsola kali |
| Senec sp. | Senecio |
| Sial | Sisymbrium altissimum |
| Sidel sp. | Sidalcea |
| Spam | Sphaeralcea ambigua |
| Sphae sp. | Sphaeralcea |
| Taof | Taraxacum officinale |
| Tarax sp. | Taraxacum |
| Thmo | Thermopsis montana |
| Trma | Trifolium macilentum |
| Veca | Veratrum californicum |
| Veth | Verbascum thapsus |
| Viad | Viola adunca |
| Viola sp. | Viola |
| Vipu | Viola purpurea |
| Wyeth sp. | Wyethia |
| Zigad sp. | Zigadenus |
| Zipa | Zigadenus paniculatus |